FCC RF Test Report

APPLICANT	:	TP-LINK TECHNOLOGIES CO., LTD.
EQUIPMENT	:	HD Pan&Tilt Day/Night Cloud Camera
BRAND NAME	:	TP-LINK
MODEL NAME	:	NC450
MARKETING NAME	:	HD Pan&Tilt Day/Night Cloud Camera
FCC ID	:	TE7NC450
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Apr. 10, 2016 and testing was completed on May 24, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR641001	Rev. 01	Initial issue of report	Jun. 14, 2016
FR641001	Rev. 02	Revising the test description of eut operation test setup, ac conducted emission test mode, average output power measurement, power spectral density measurement and antenna requirement in report section 2.3, 2.6, 3.2.3, 3.3.3, 3.7.2, 3.7.3, and 5.	Jul. 06, 2016
FR641001	Rev. 03	Revising the test description of Antenna Anti-Replacement Construction in report section 3.7.2.	Jul. 11, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.52 dB at 2483.520 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 10.10 dB at 0.398 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China

1.2 Manufacturer

TP-LINK TECHNOLOGIES CO., LTD.
Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	HD Pan&Tilt Day/Night Cloud Camera
Brand Name	TP-LINK
Model Name	NC450
Marketing Name	HD Pan&Tilt Day/Night Cloud Camera
FCC ID	TE7NC450
EUT supports Radios application	WLAN 11b/g/n HT20/HT40
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum (Average) Output Power to antenna</td><td><MIMO Ant. 1+2>
802.11b : 21.87 dBm (0.1538 W)
802.11g : 22.53 dBm (0.1791 W)
802.11n HT20 : 20.67 dBm (0.1167 W)
802.11n HT40 : 19.22 dBm (0.0836 W)</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11b : 12.70MHz
802.11g : 18.55MHz
802.11n HT20 : 18.70MHz
802.11n HT40 : 37.10MHz</td></tr>
<tr><td>Antenna Type</td><td><Ant 1>
802.11b/g/n : PIFA Antenna type with gain 3.34 dBi
<Ant 2>
802.11b/g/n : External Omni Antenna type with gain 3.05 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td><table><tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr><tr><td>802.11 b/g/n SISO</td><td>-</td><td>-</td></tr><tr><td>802.11 b/g/n MIMO</td><td>V</td><td>V</td></tr></table></td></tr>
</table>

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH02-HY	CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No. :**
	03CH12-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

MIMO <Ant. 1+2>

802.11b				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Average Power (dBm)	21.87	21.84	21.85	21.84

802.11g								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	22.53	22.50	22.52	22.52	22.29	22.44	22.51	22.51

2.4GHz 802.11n HT20								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	20.67	20.65	20.54	20.60	20.27	20.41	20.38	20.52

2.4GHz 802.11n HT40								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	19.22	19.09	19.16	19.02	18.73	18.75	18.60	18.72

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

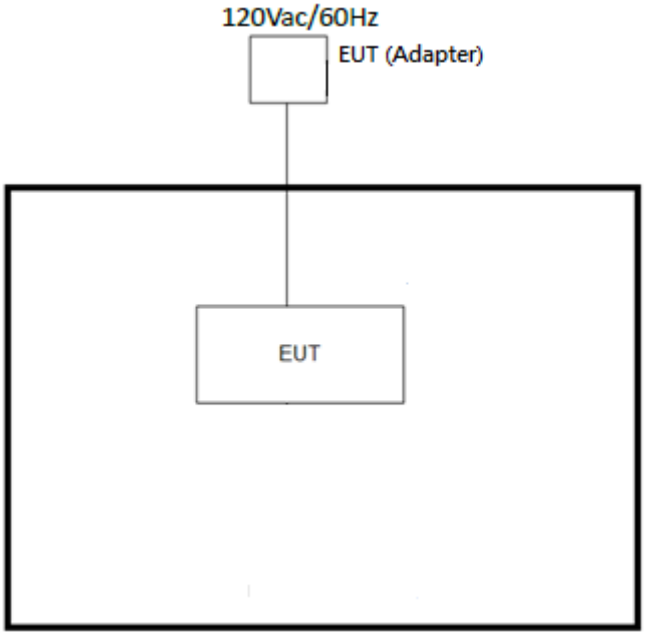
MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

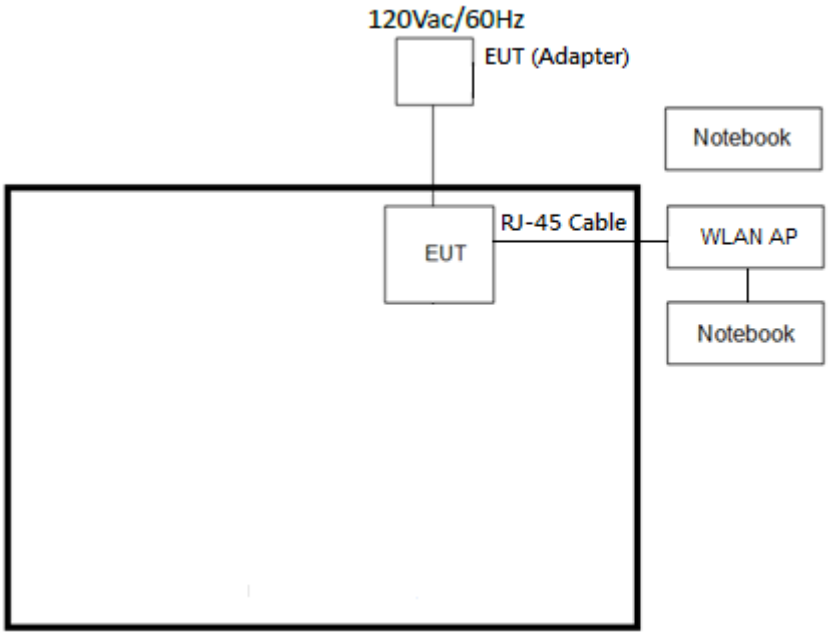
Test Cases	
AC Conducted Emission	Mode 1 :WLAN (2.4GHz) 11n HT20 CH11 MCS0 Link + LAN Link + SD Card (Vedio Record) + Adapter

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	SD Card	SanDisk	16G	FCC DoC	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “Command Prompt ” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

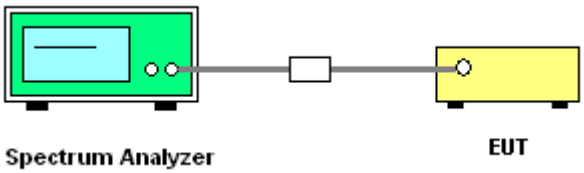
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

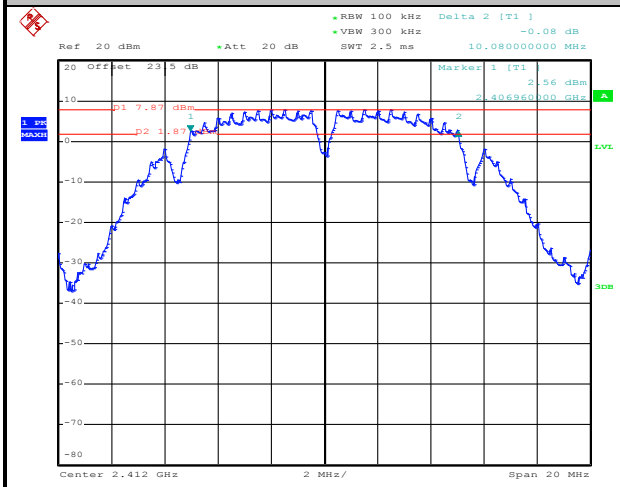
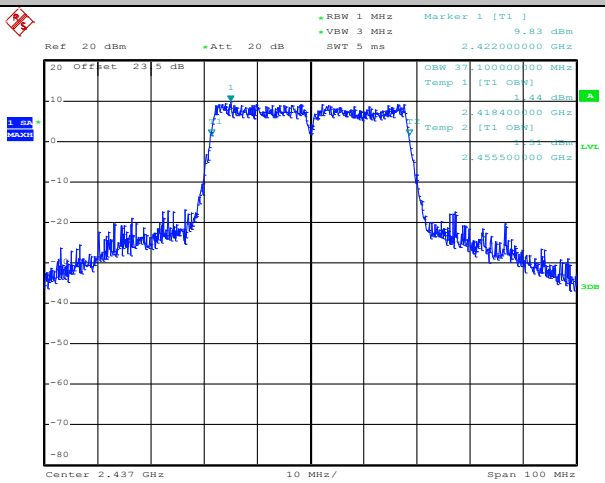
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A of this test report.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	
Date: 29.APR.2016 20:08:23	Date: 20.MAY.2016 21:35:24

Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Average Output Power Measurement

3.2.1 Limit of Average Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for average output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the average output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

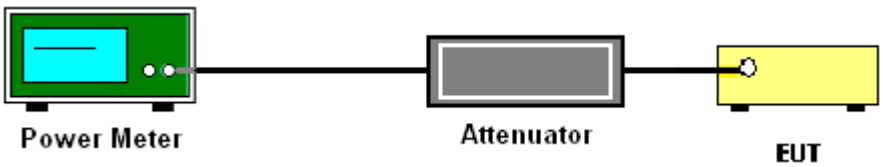
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r05 section 9.2.3.1 Method AVGPM
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Average Output Power

Please refer to Appendix A of this test report.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05. section 10.5 Method AVGPSD-2
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = RMS, Sweep time = auto couple, Trace mode = Average, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

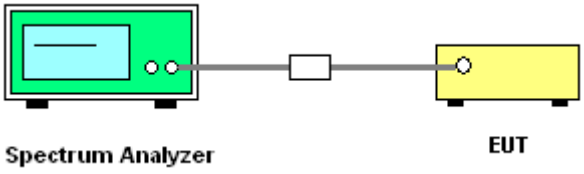
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

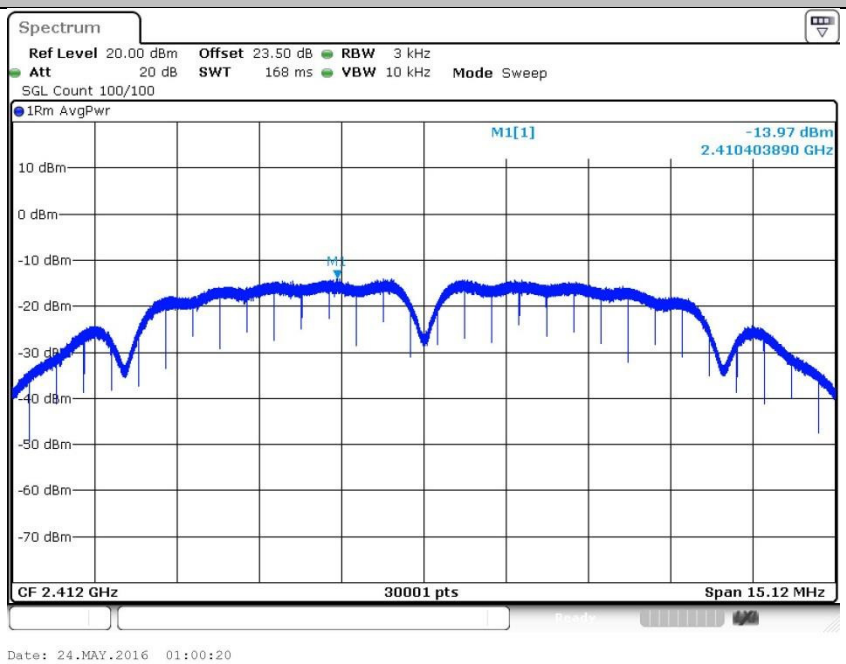
3.3.4 Test Setup



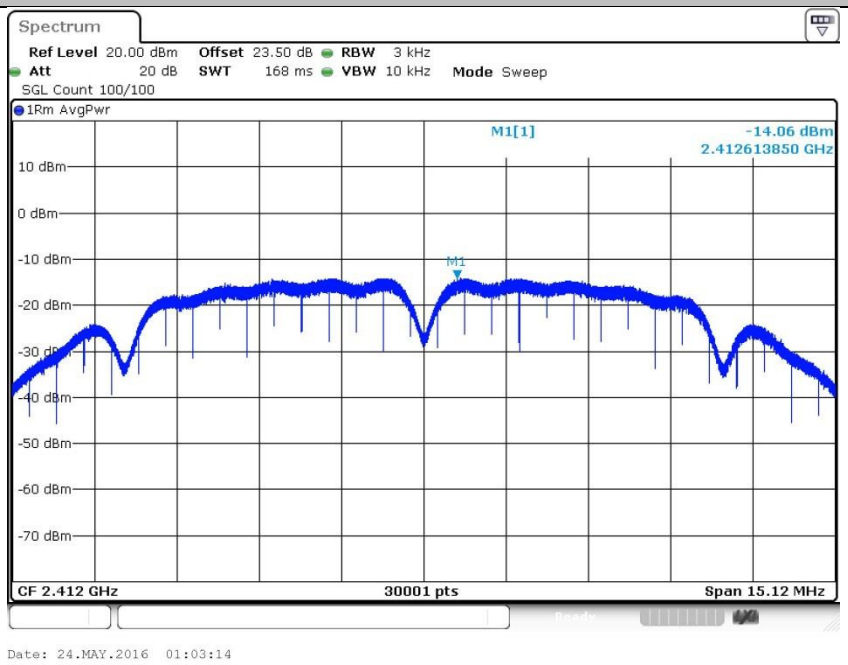
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.

Worst Case Power Density (dBm/3kHz) for MIMO Ant. 1



Worst Case Power Density (dBm/3kHz) for MIMO Ant. 2



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

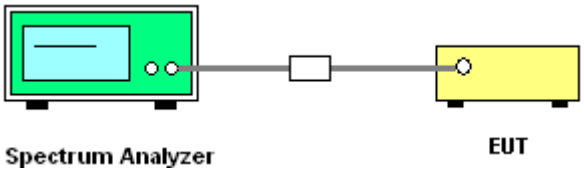
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum average conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



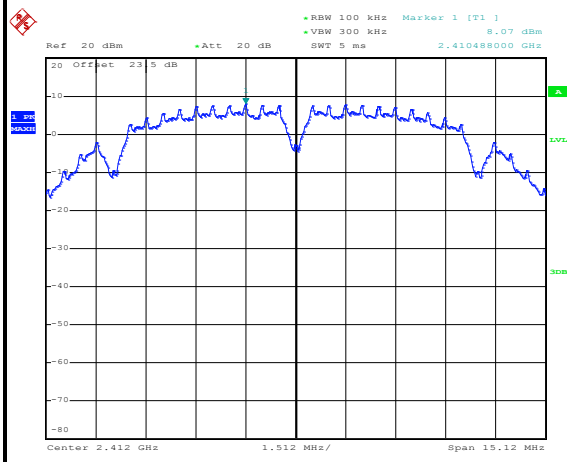
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 2, Ant. 1 (Measured)

Number of TX	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

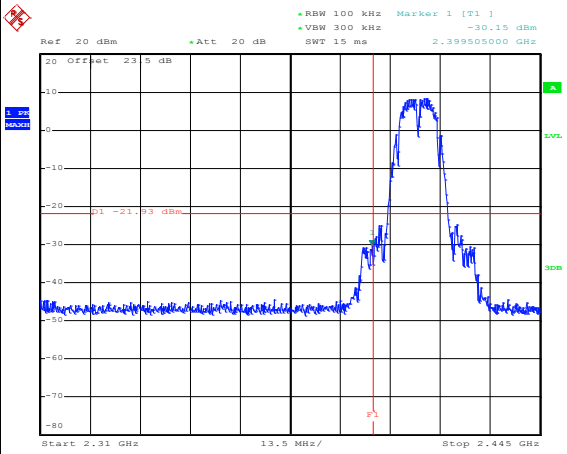
WLAN 802.11b Channel 01

100kHz PSD reference Level



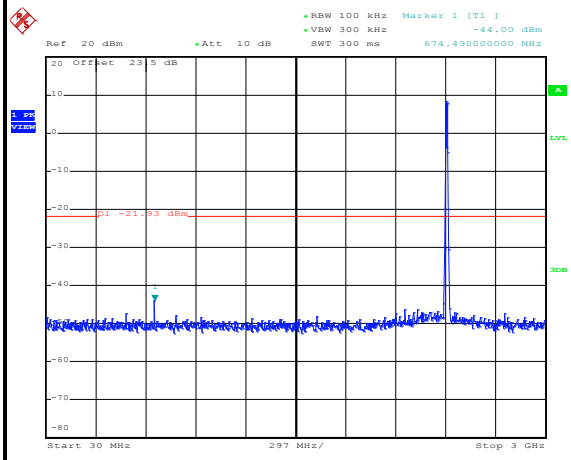
Date: 29.APR.2016 20:09:34

Low Channel Plot



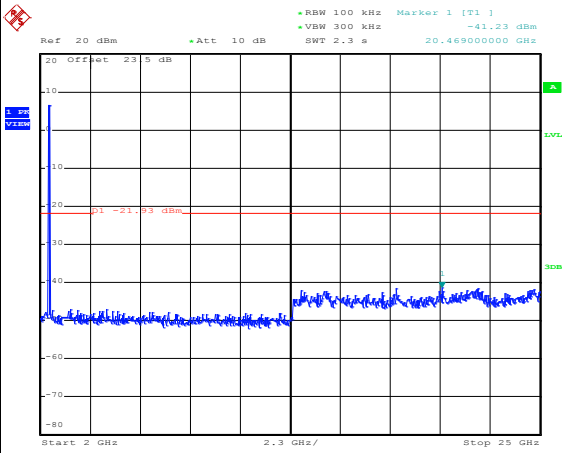
Date: 1.MAY.2016 03:48:25

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:48:38

Spurious Emission 2GHz~25GHz

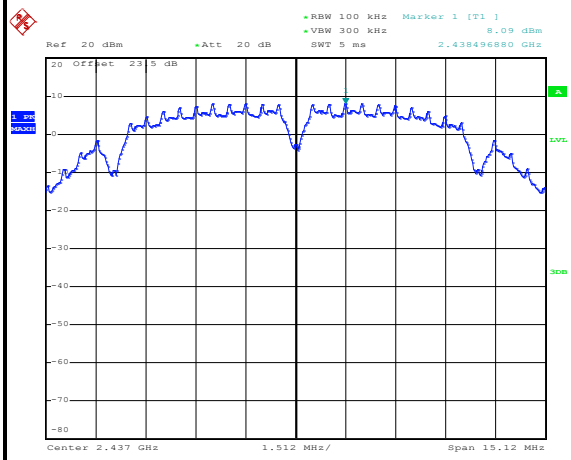


Date: 1.MAY.2016 03:48:47

Number of TX	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11b Channel 06

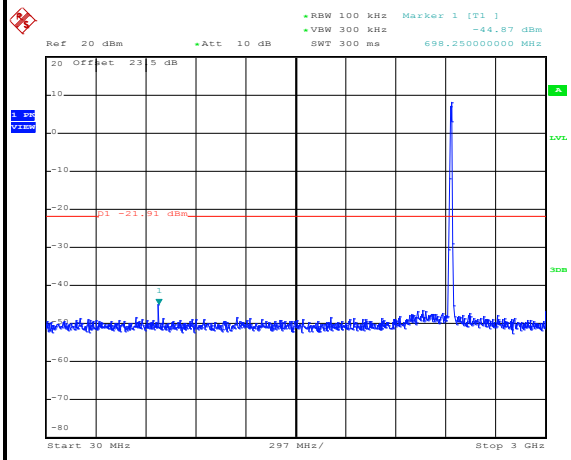
100kHz PSD reference Level



Date: 29.APR.2016 20:22:04

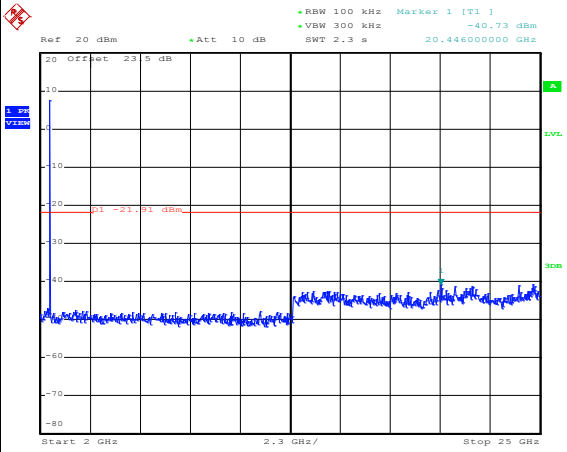
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:51:28

Spurious Emission 2GHz~25GHz

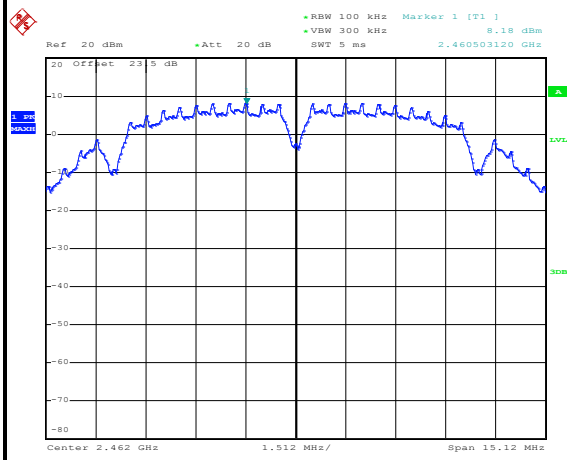


Date: 1.MAY.2016 03:51:37

Number of TX	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

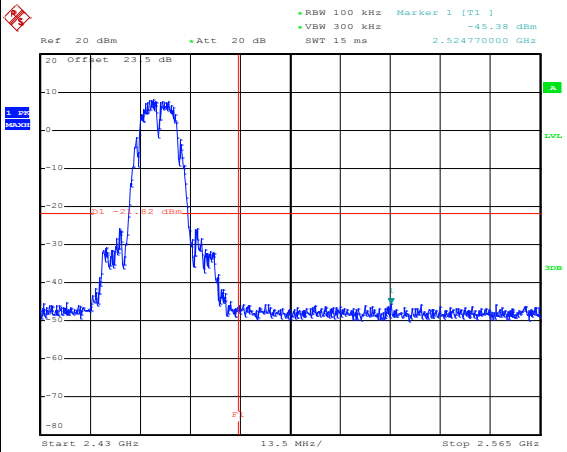
WLAN 802.11b Channel 11

100kHz PSD reference Level



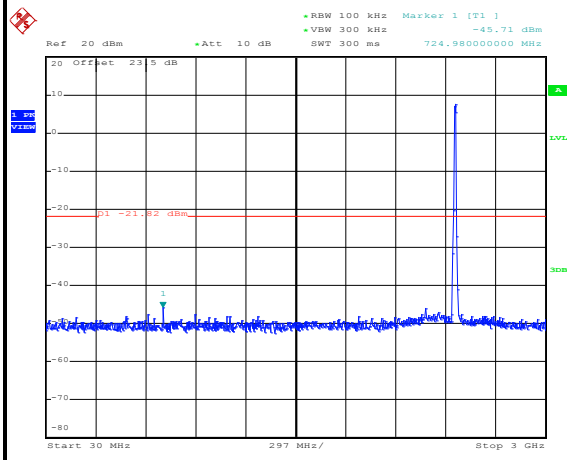
Date: 29.APR.2016 20:32:45

High Channel Plot



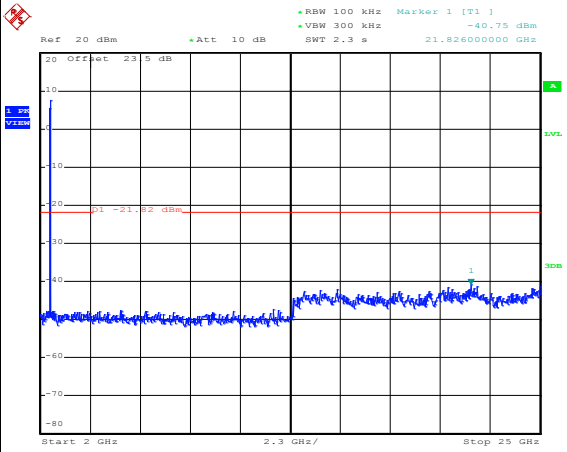
Date: 1.MAY.2016 03:55:50

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:56:02

Spurious Emission 2GHz~25GHz

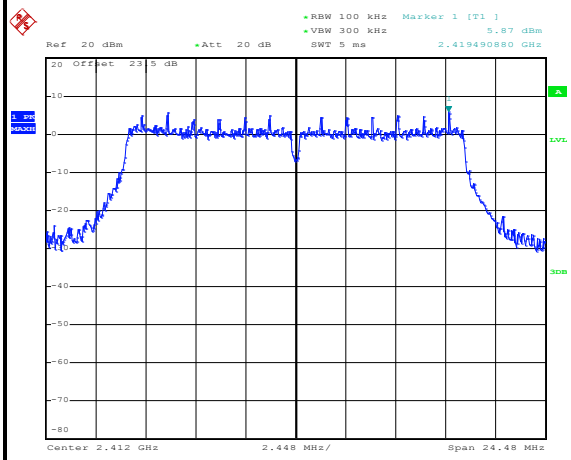


Date: 1.MAY.2016 03:56:11

Number of TX	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

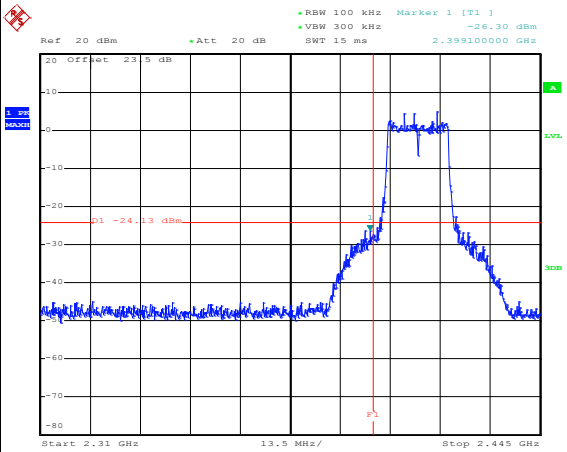
WLAN 802.11g Channel 01

100kHz PSD reference Level



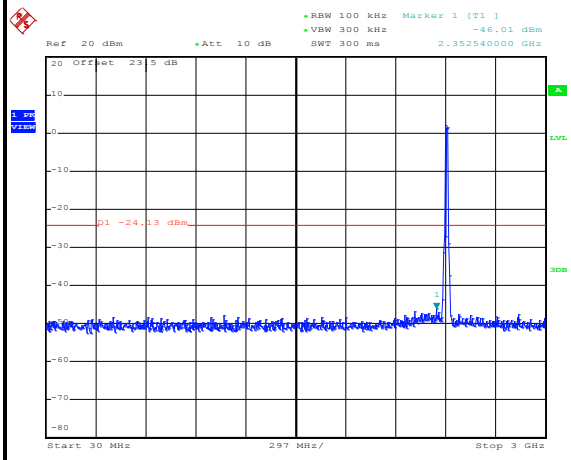
Date: 20.MAY.2016 20:23:12

Low Channel Plot



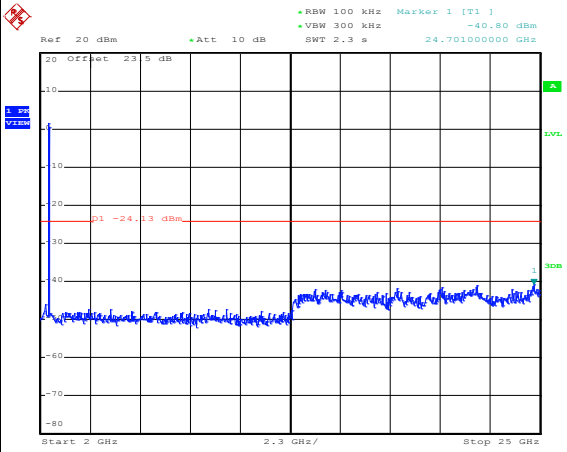
Date: 20.MAY.2016 20:23:31

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:23:51

Spurious Emission 2GHz~25GHz

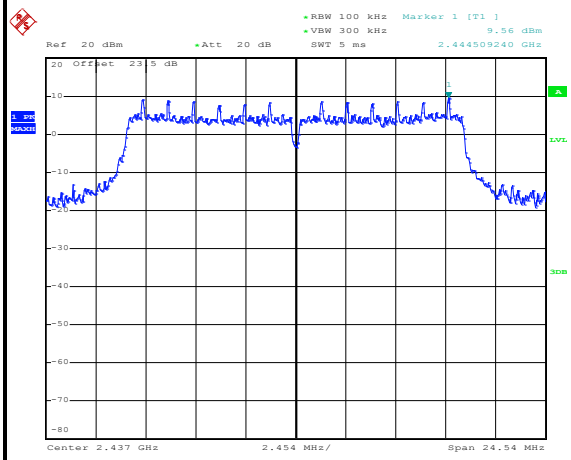


Date: 20.MAY.2016 20:24:00

Number of TX	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11g Channel 06

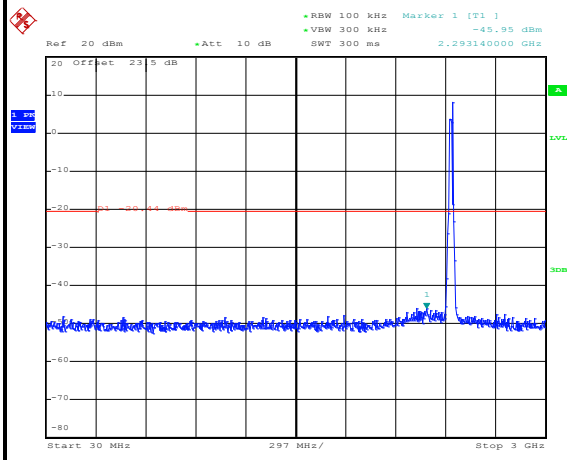
100kHz PSD reference Level



Date: 29.APR.2016 21:48:06

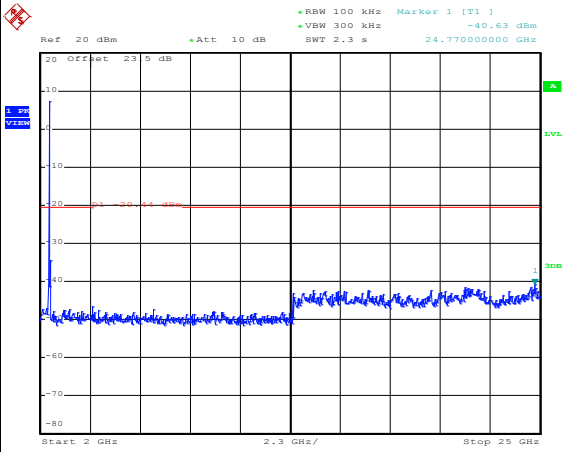
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 04:06:30

Spurious Emission 2GHz~25GHz

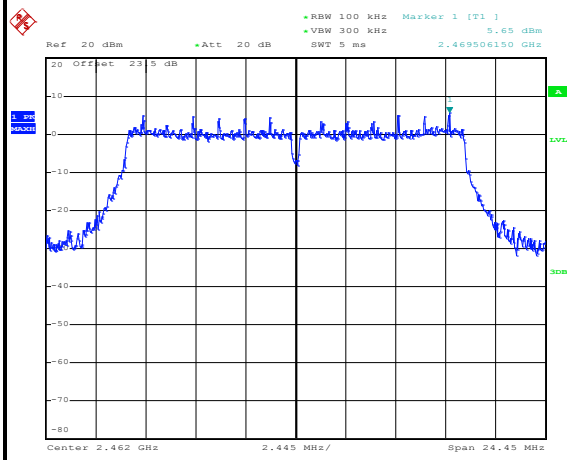


Date: 1.MAY.2016 04:06:39

Number of TX	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

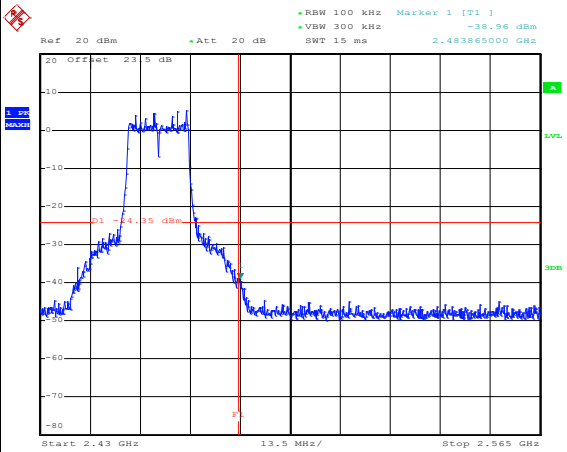
WLAN 802.11g Channel 11

100kHz PSD reference Level



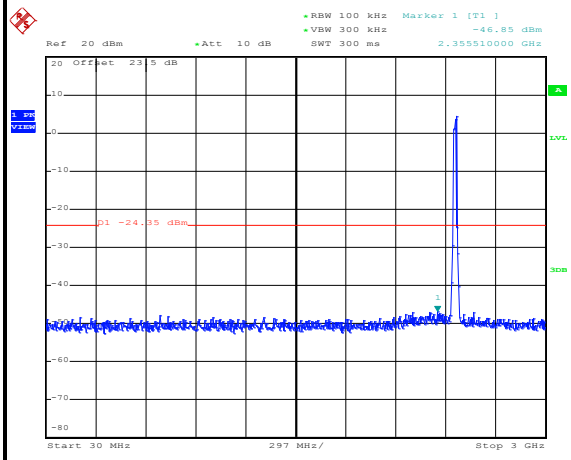
Date: 20.MAY.2016 20:38:33

High Channel Plot



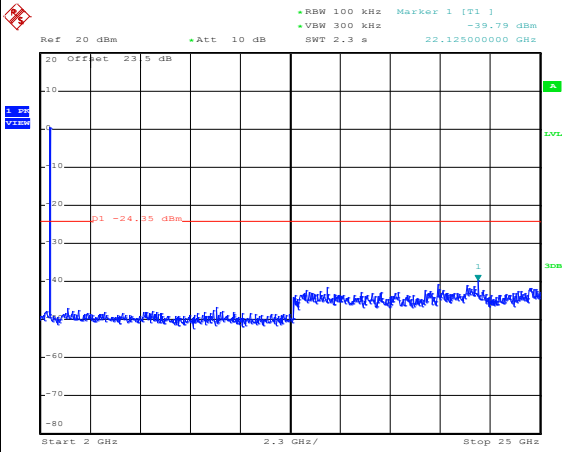
Date: 20.MAY.2016 20:38:45

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:39:03

Spurious Emission 2GHz~25GHz

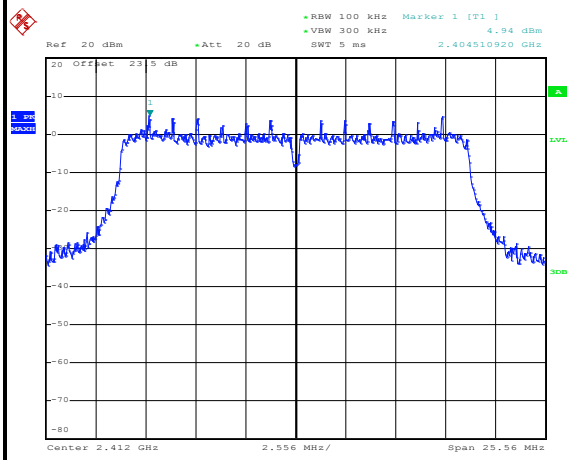


Date: 20.MAY.2016 20:39:11

Number of TX	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

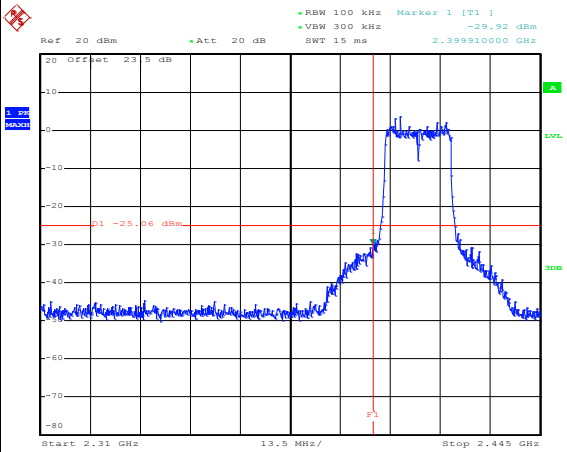
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



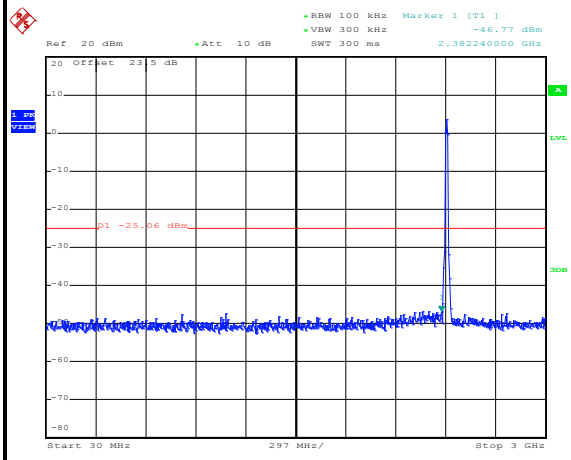
Date: 20.MAY.2016 20:45:33

Low Channel Plot



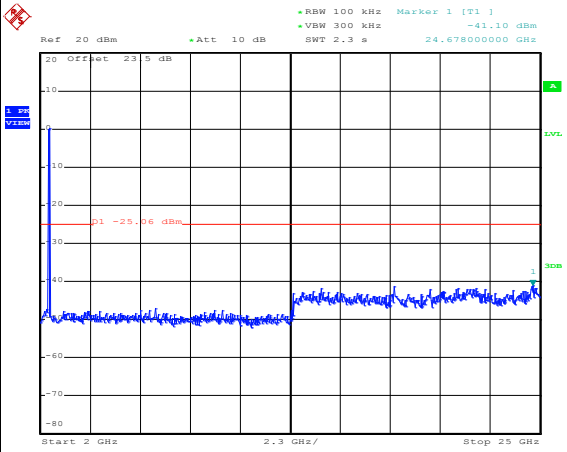
Date: 20.MAY.2016 20:45:51

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:46:03

Spurious Emission 2GHz~25GHz

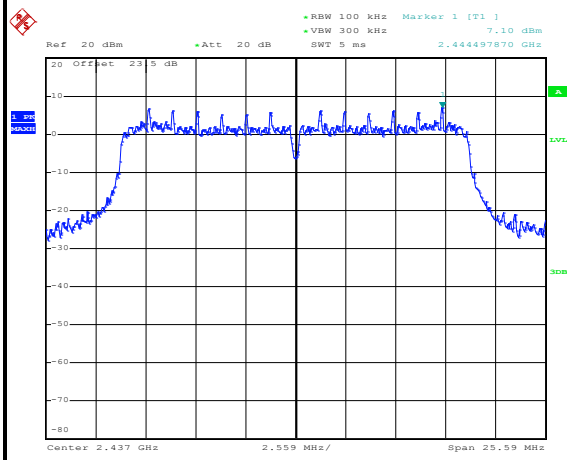


Date: 20.MAY.2016 20:46:11

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11n HT20 Channel 06

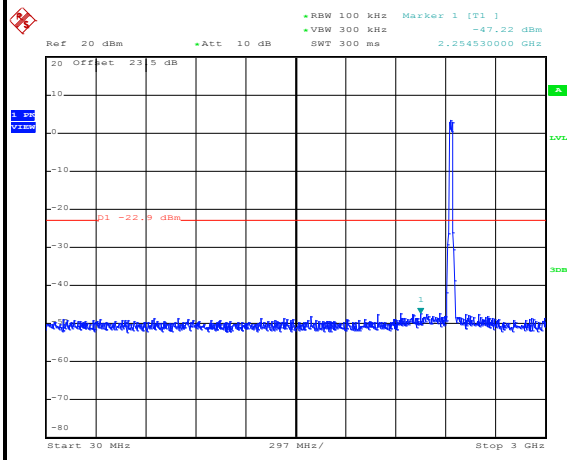
100kHz PSD reference Level



Date: 29.APR.2016 22:35:33

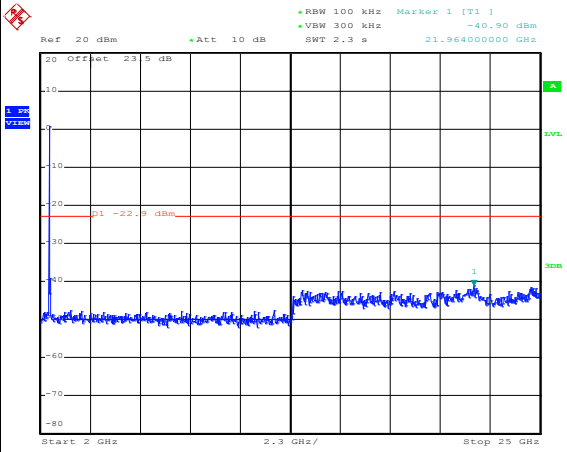
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 04:16:35

Spurious Emission 2GHz~25GHz

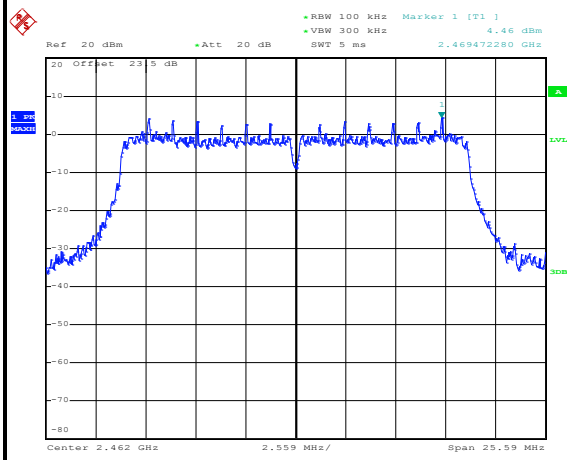


Date: 1.MAY.2016 04:16:43

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

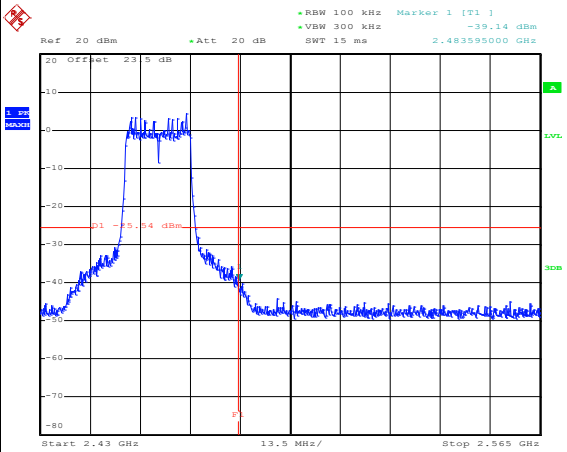
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



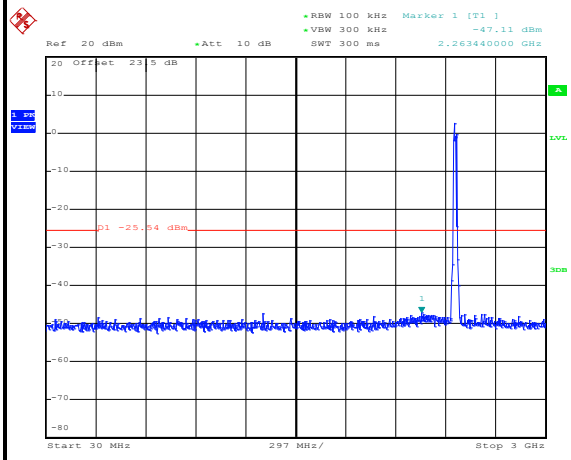
Date: 20.MAY.2016 20:50:35

High Channel Plot



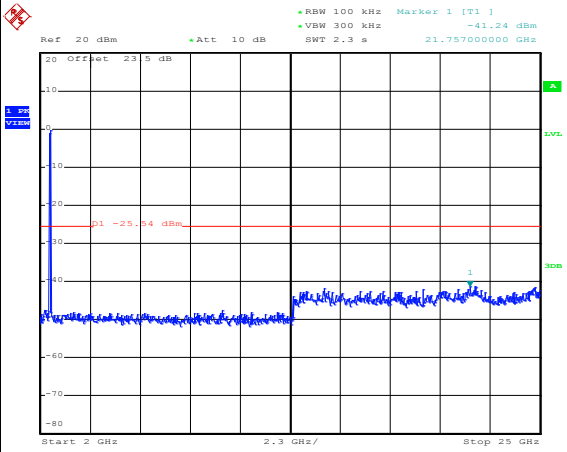
Date: 20.MAY.2016 20:50:52

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:51:03

Spurious Emission 2GHz~25GHz

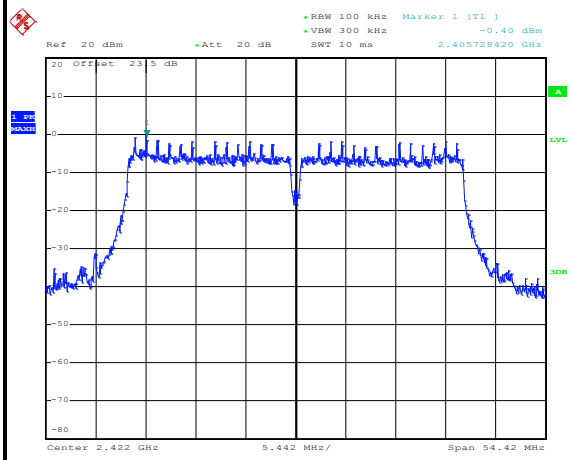


Date: 20.MAY.2016 20:51:11

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	03	**Test Engineer :**	Osolemio Chang and Derek Hsu

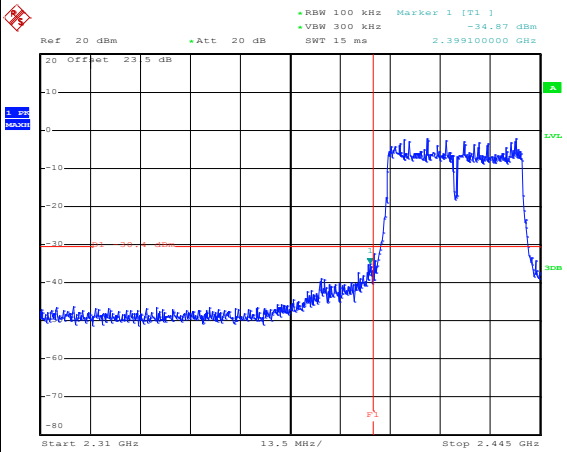
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



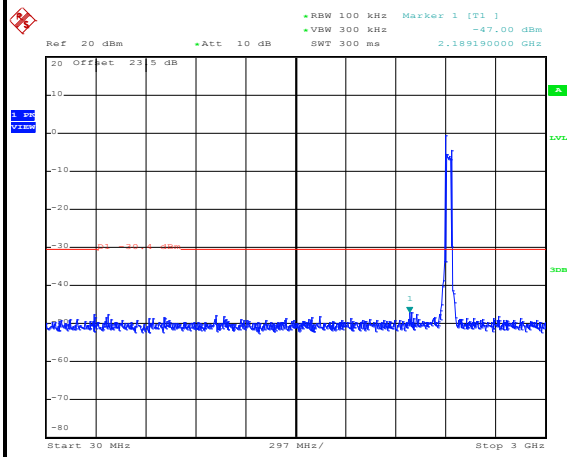
Date: 20.MAY.2016 20:58:55

Low Channel Plot



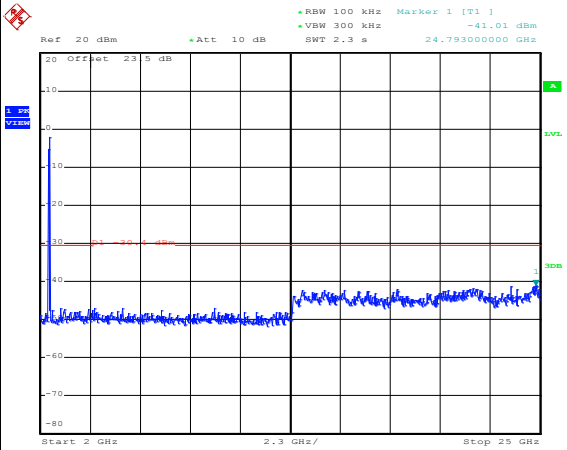
Date: 20.MAY.2016 20:59:17

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:00:20

Spurious Emission 2GHz~25GHz

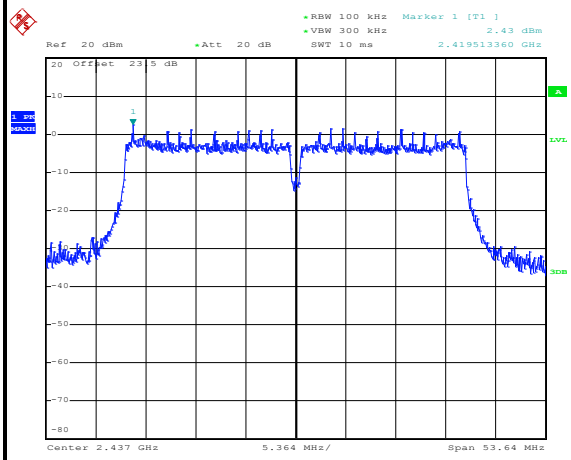


Date: 20.MAY.2016 21:00:29

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11n HT40 Channel 06

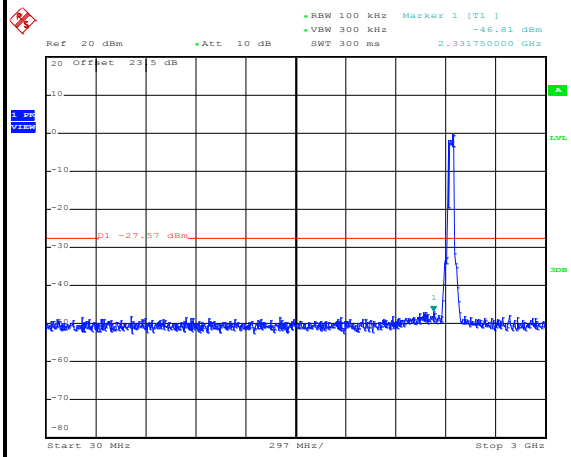
100kHz PSD reference Level



Date: 20.MAY.2016 21:32:19

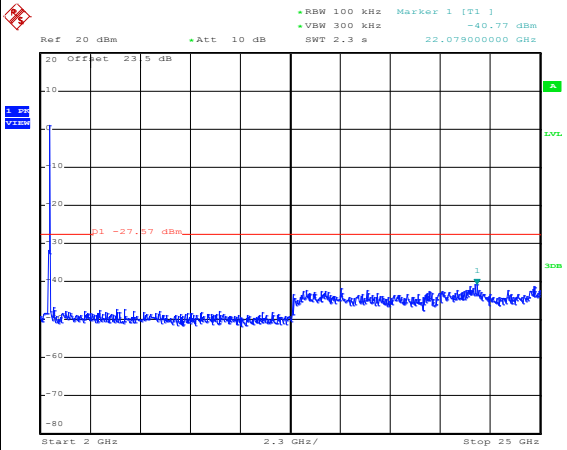
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:32:50

Spurious Emission 2GHz~25GHz

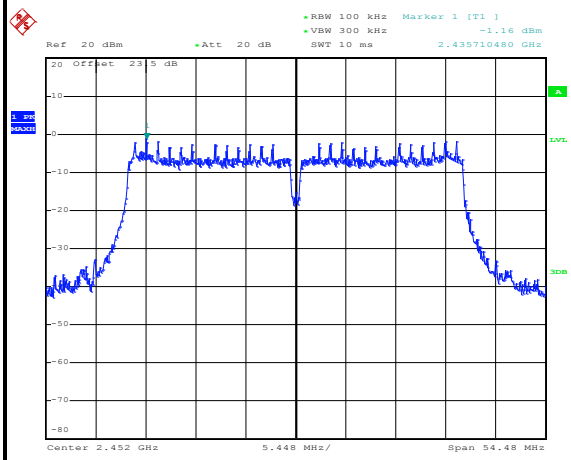


Date: 20.MAY.2016 21:32:58

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	09	**Test Engineer :**	Osolemio Chang and Derek Hsu

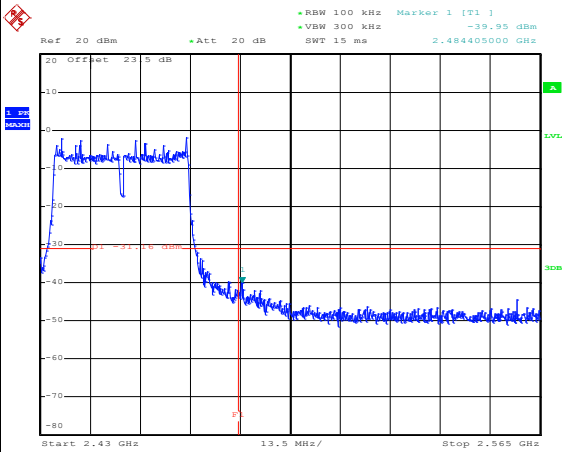
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



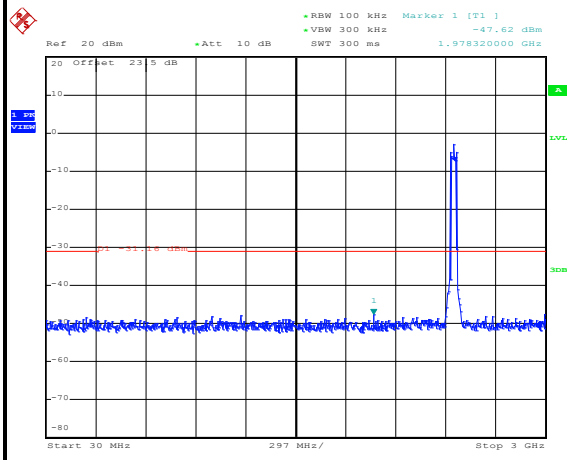
Date: 20.MAY.2016 21:16:13

High Channel Plot



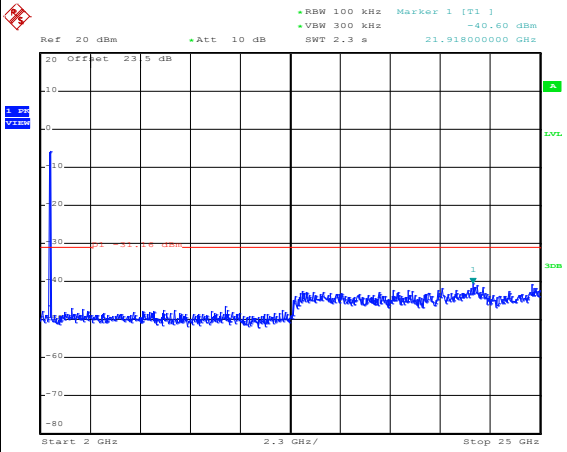
Date: 20.MAY.2016 21:16:22

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:16:37

Spurious Emission 2GHz~25GHz



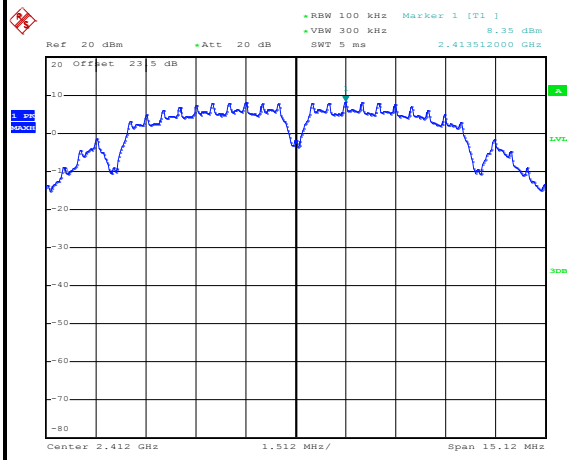
Date: 20.MAY.2016 21:16:45

Number of TX = 2, Ant. 2 (Measured)

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

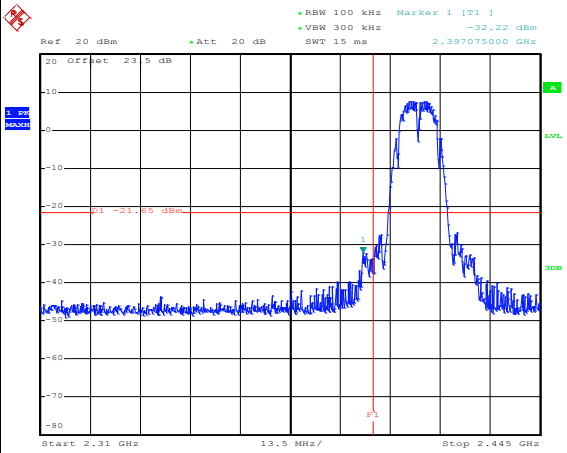
WLAN 802.11b Channel 01

100kHz PSD reference Level



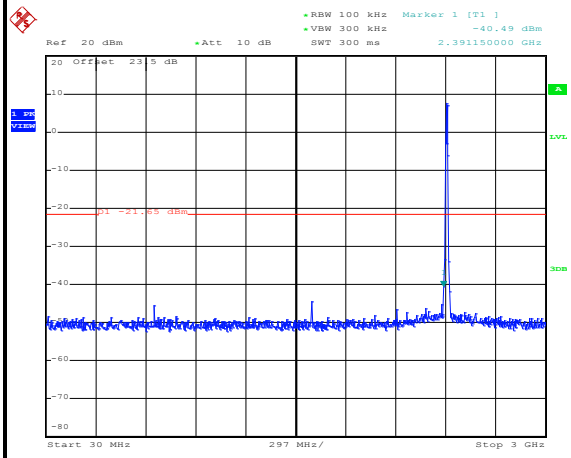
Date: 29.APR.2016 20:14:40

Low Channel Plot



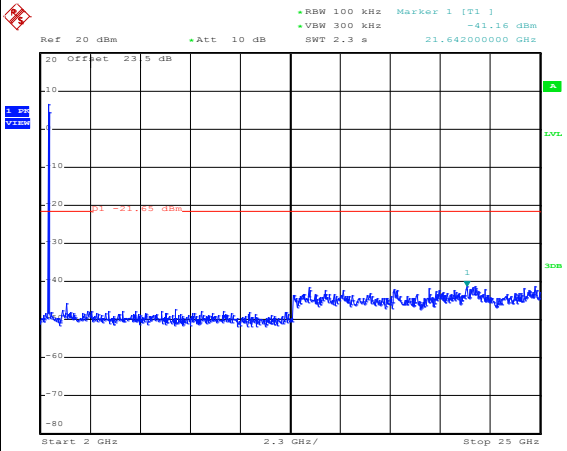
Date: 1.MAY.2016 03:49:34

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:49:48

Spurious Emission 2GHz~25GHz

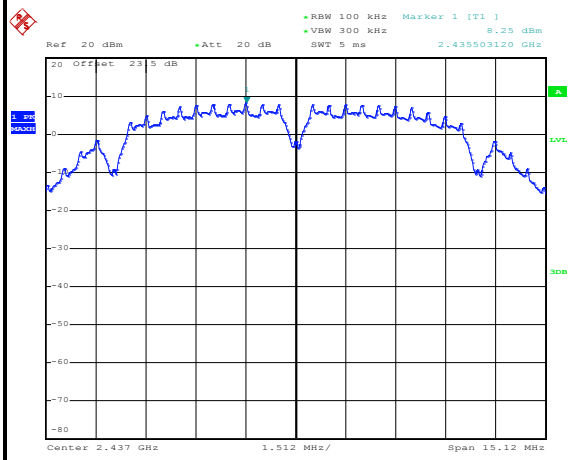


Date: 1.MAY.2016 03:49:56

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11b Channel 06

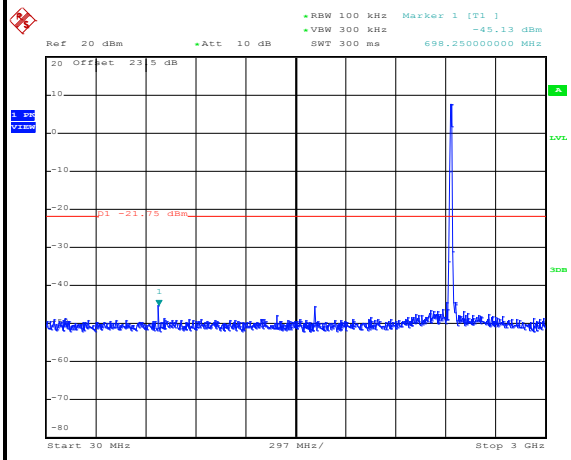
100kHz PSD reference Level



Date: 29.APR.2016 20:27:47

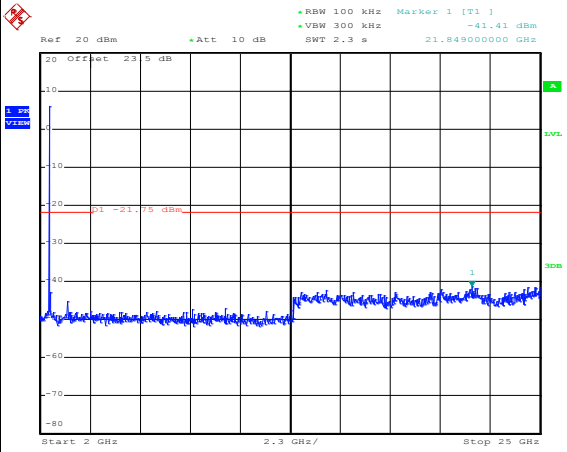
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:54:26

Spurious Emission 2GHz~25GHz

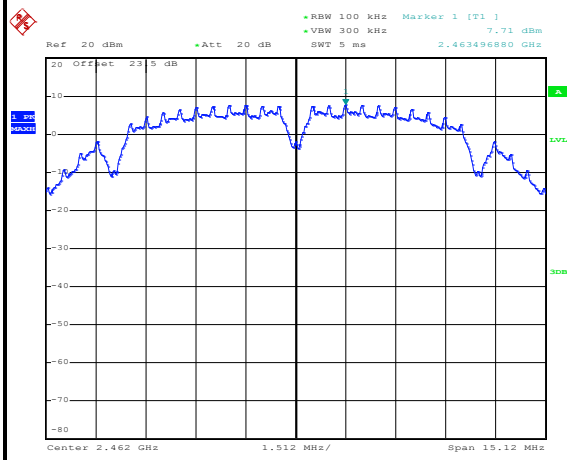


Date: 1.MAY.2016 03:54:03

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

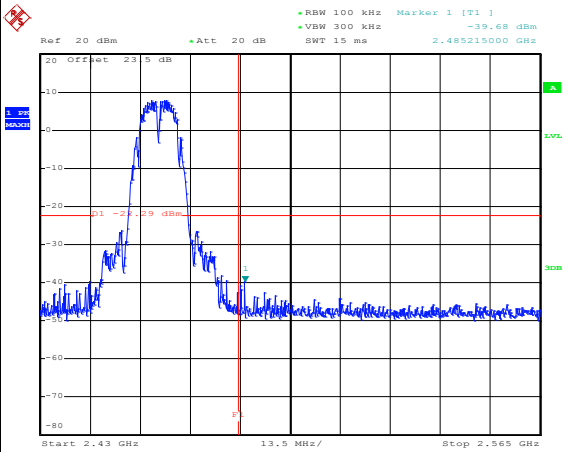
WLAN 802.11b Channel 11

100kHz PSD reference Level



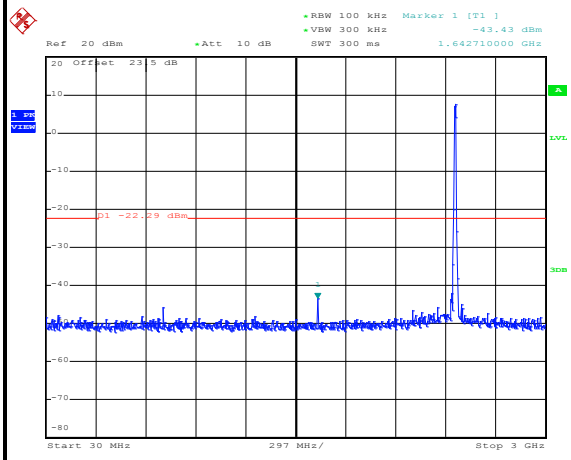
Date: 29.APR.2016 20:41:20

High Channel Plot



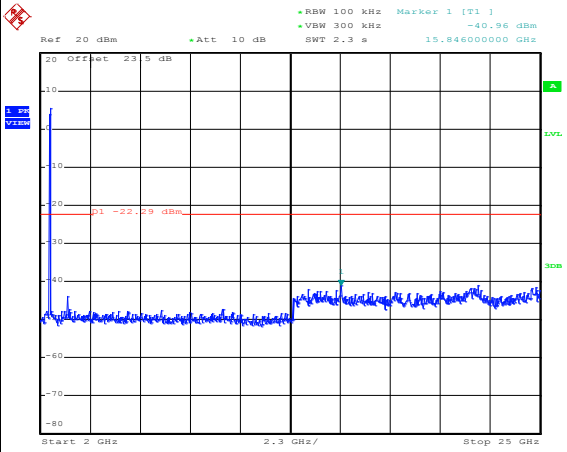
Date: 1.MAY.2016 03:57:15

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 03:58:53

Spurious Emission 2GHz~25GHz

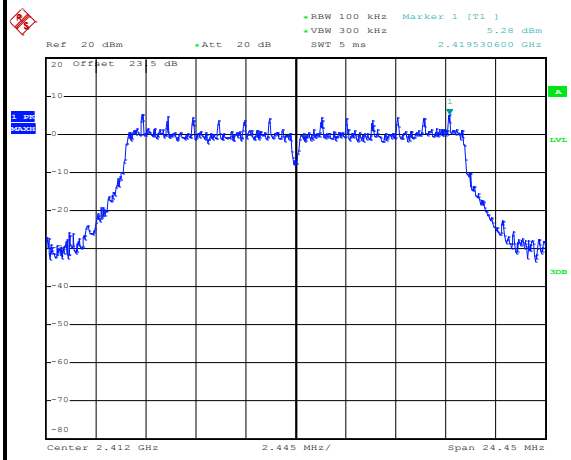


Date: 1.MAY.2016 03:58:16

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

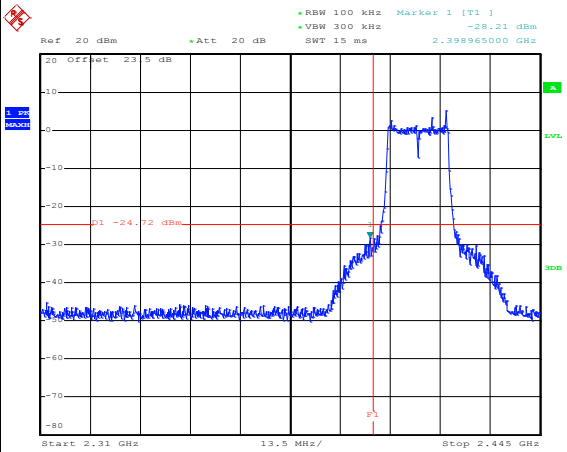
WLAN 802.11g Channel 01

100kHz PSD reference Level



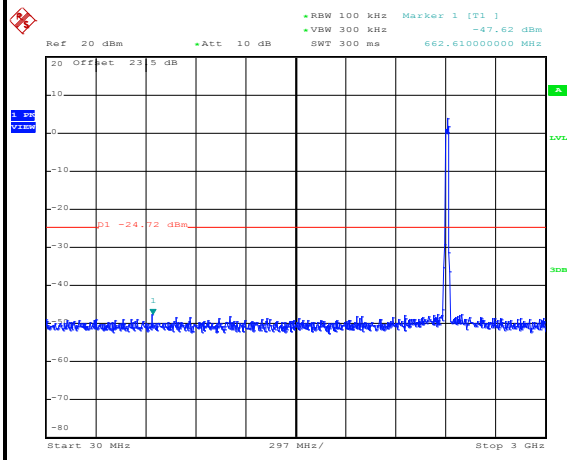
Date: 20.MAY.2016 20:28:31

Low Channel Plot



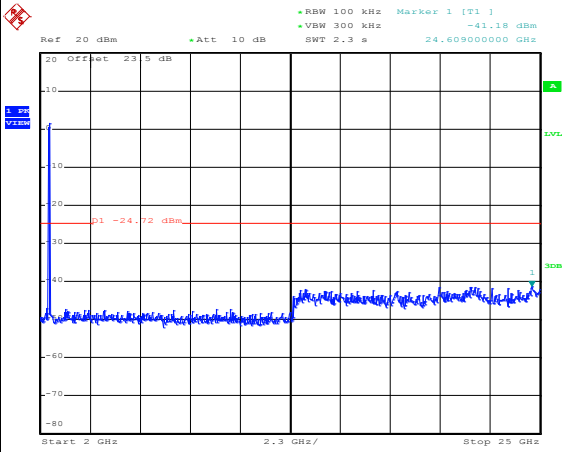
Date: 20.MAY.2016 20:28:42

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:28:55

Spurious Emission 2GHz~25GHz

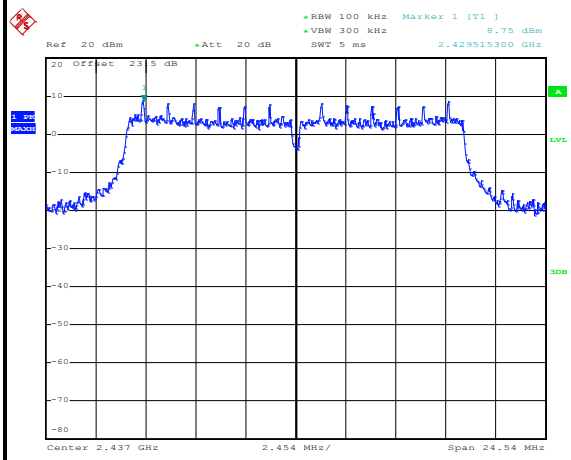


Date: 20.MAY.2016 20:29:04

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11g Channel 06

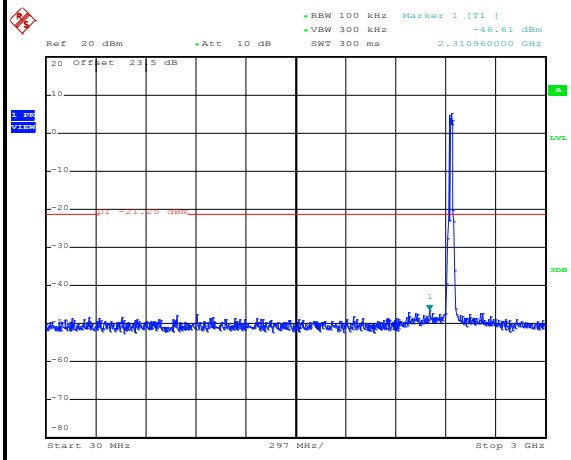
100kHz PSD reference Level



Date: 29.APR.2016 21:56:58

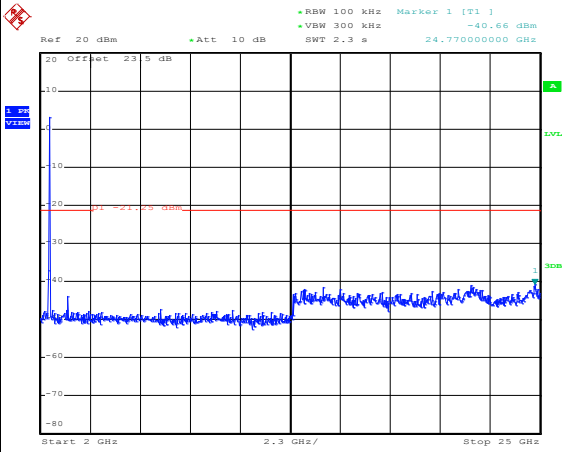
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 04:07:56

Spurious Emission 2GHz~25GHz

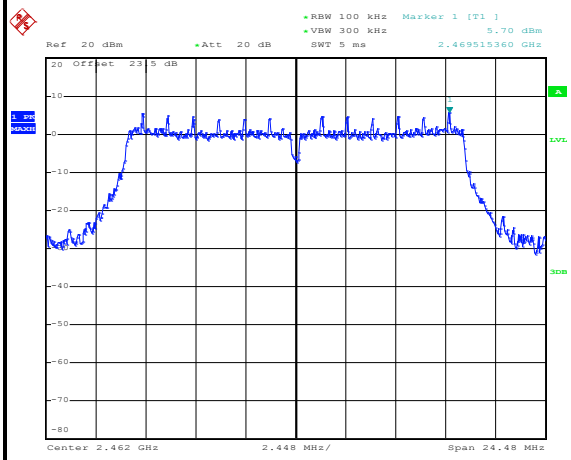


Date: 1.MAY.2016 04:08:04

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

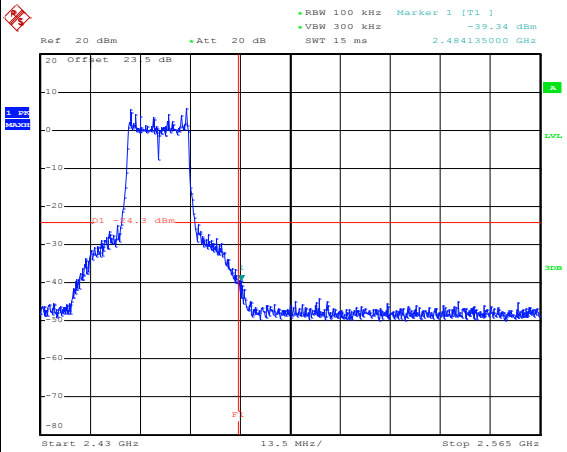
WLAN 802.11g Channel 11

100kHz PSD reference Level



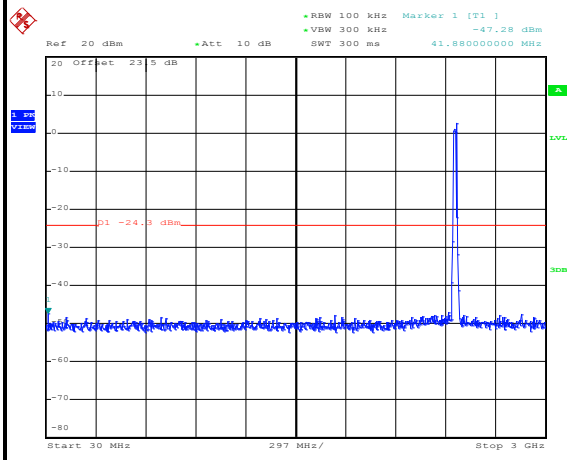
Date: 20.MAY.2016 20:40:40

High Channel Plot



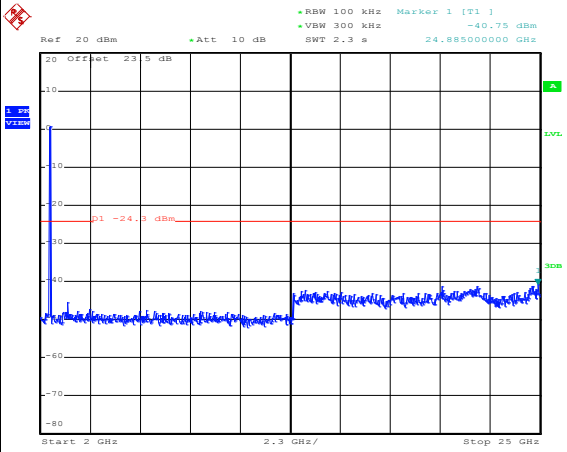
Date: 20.MAY.2016 20:40:51

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:41:05

Spurious Emission 2GHz~25GHz

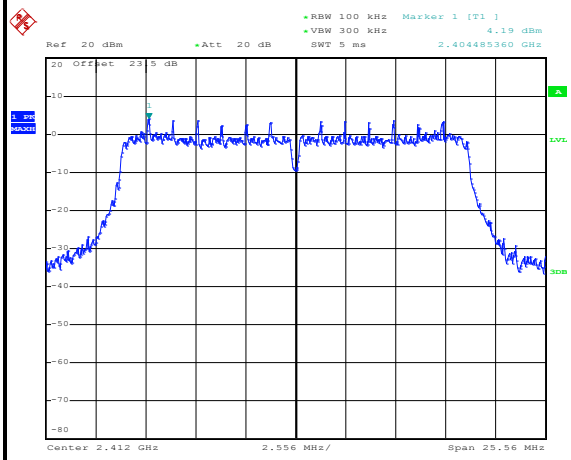


Date: 20.MAY.2016 20:41:14

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Osolemio Chang and Derek Hsu

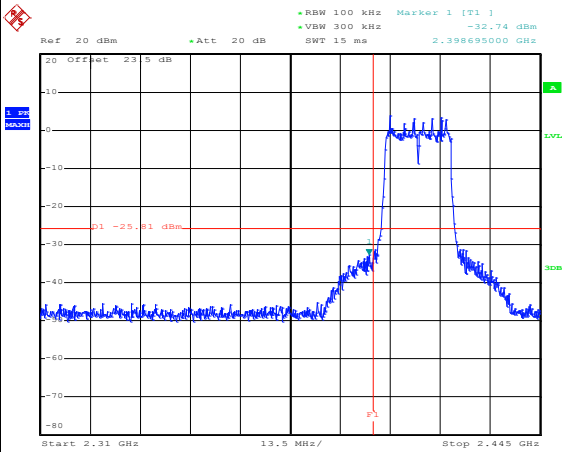
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



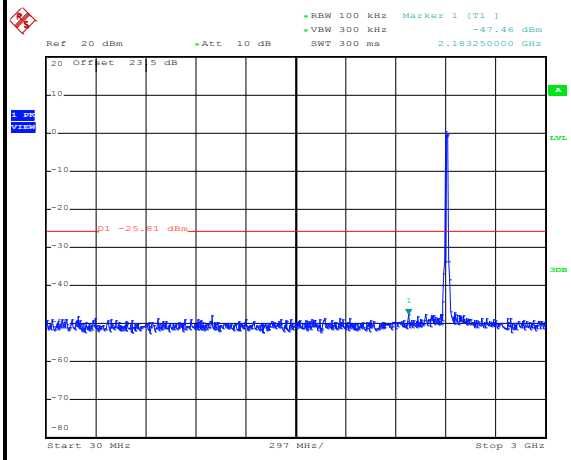
Date: 20.MAY.2016 20:47:43

Low Channel Plot



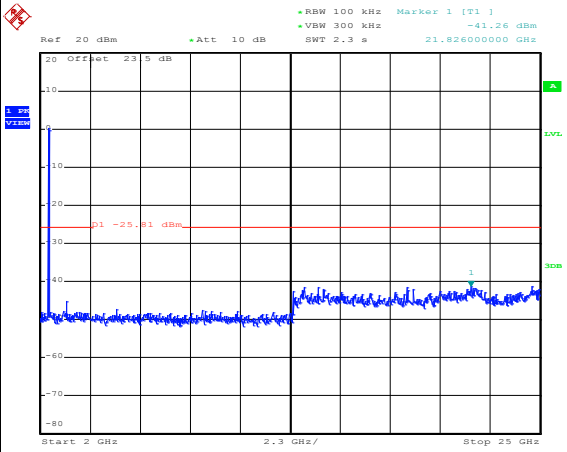
Date: 20.MAY.2016 20:47:53

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:48:04

Spurious Emission 2GHz~25GHz

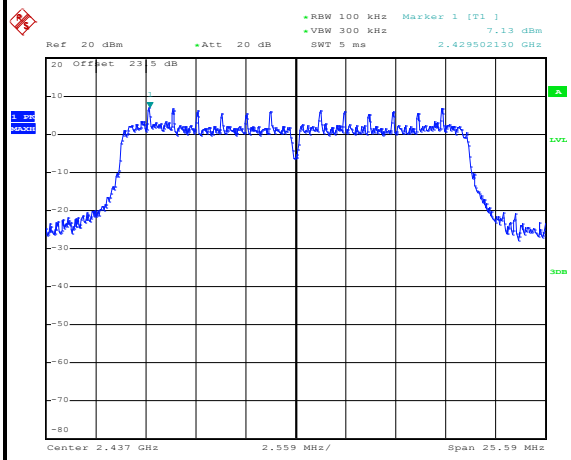


Date: 20.MAY.2016 20:48:12

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11n HT20 Channel 06

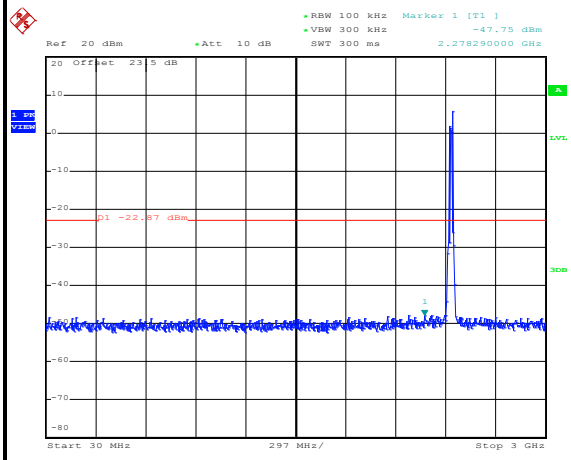
100kHz PSD reference Level



Date: 29.APR.2016 22:40:21

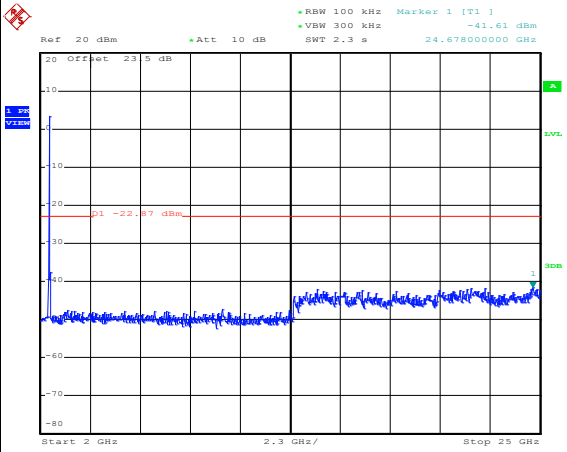
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 1.MAY.2016 04:20:33

Spurious Emission 2GHz~25GHz

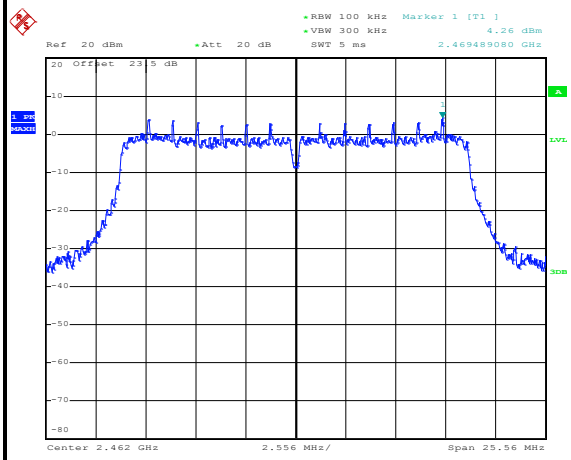


Date: 1.MAY.2016 04:20:42

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Osolemio Chang and Derek Hsu

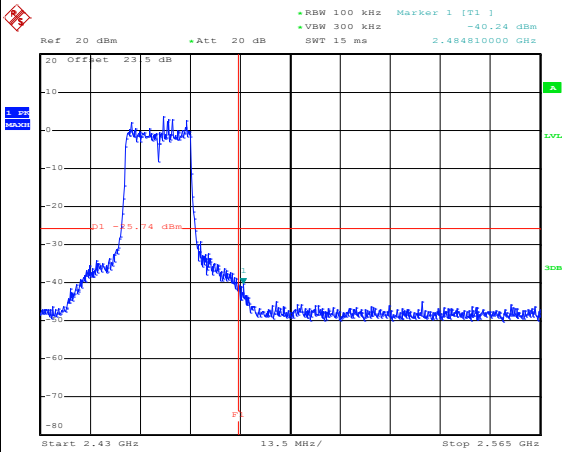
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



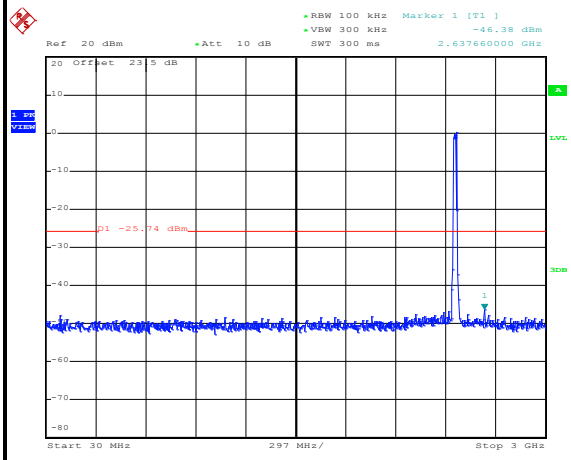
Date: 20.MAY.2016 20:53:50

High Channel Plot



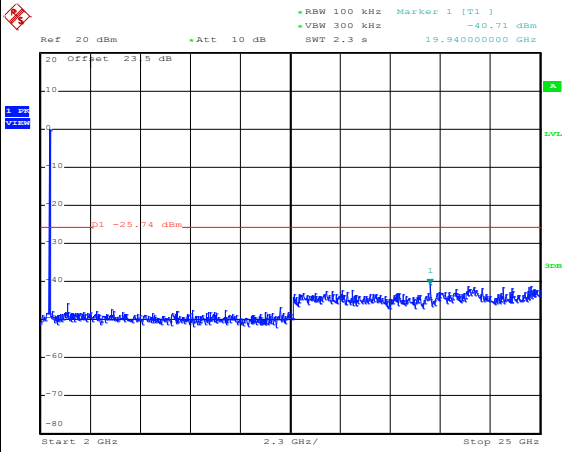
Date: 20.MAY.2016 20:54:11

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 20:54:26

Spurious Emission 2GHz~25GHz

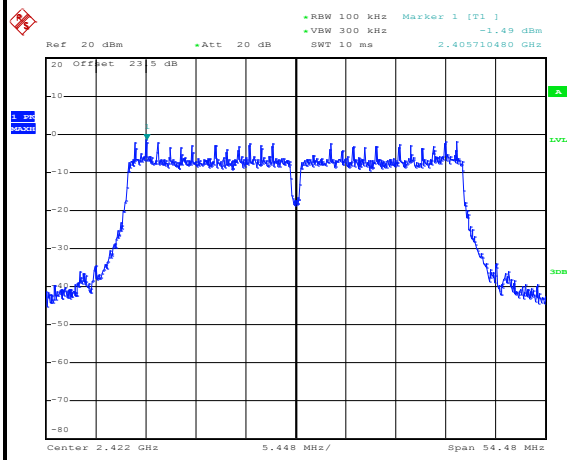


Date: 20.MAY.2016 20:54:34

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	03	**Test Engineer :**	Osolemio Chang and Derek Hsu

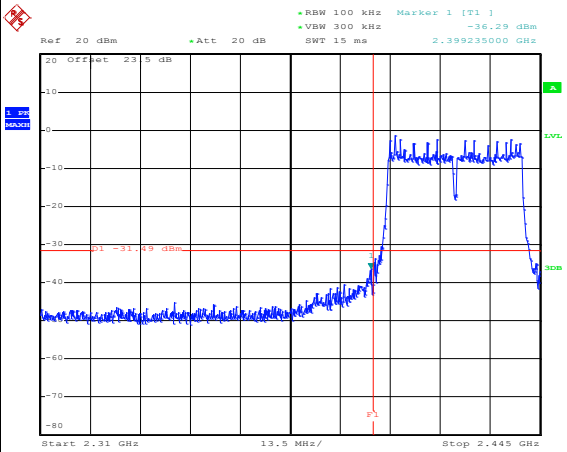
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



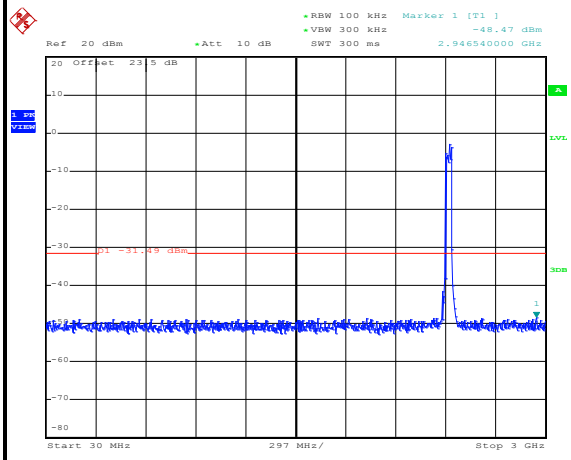
Date: 20.MAY.2016 21:10:22

Low Channel Plot



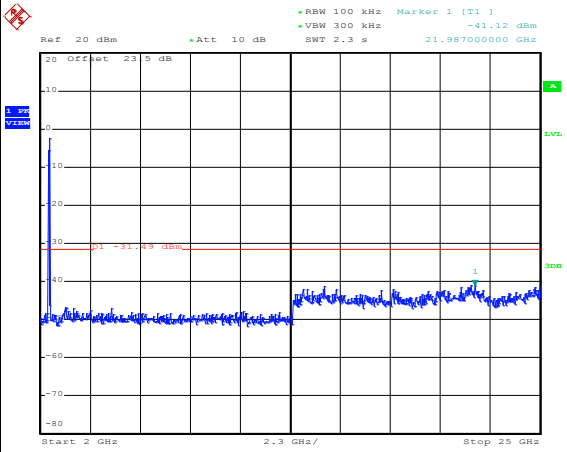
Date: 20.MAY.2016 21:10:31

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:12:52

Spurious Emission 2GHz~25GHz

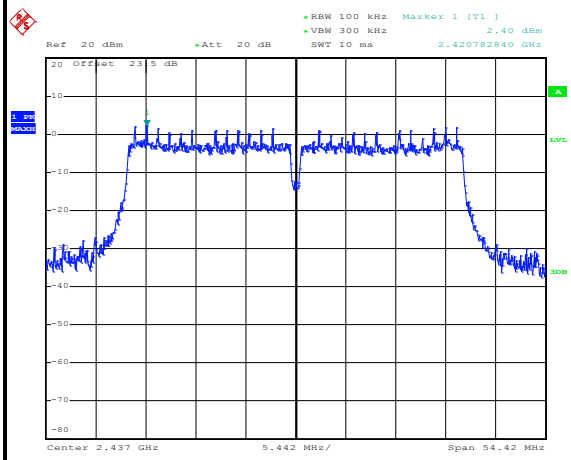


Date: 20.MAY.2016 21:11:35

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Osolemio Chang and Derek Hsu

WLAN 802.11n HT40 Channel 06

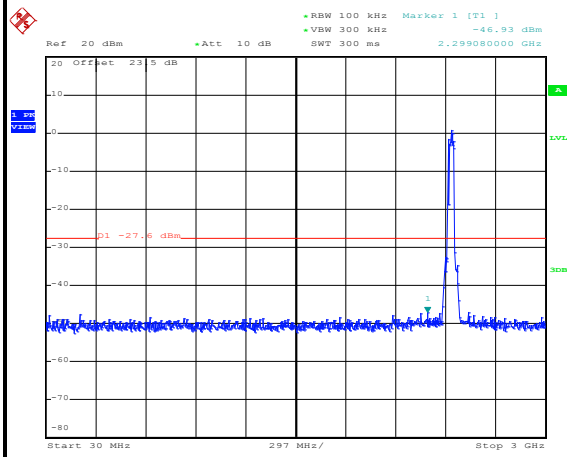
100kHz PSD reference Level



Date: 20.MAY.2016 21:34:48

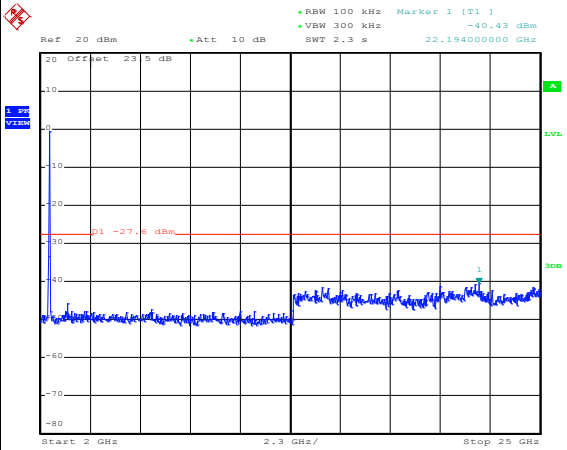
Mid Channel Plot

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:34:59

Spurious Emission 2GHz~25GHz

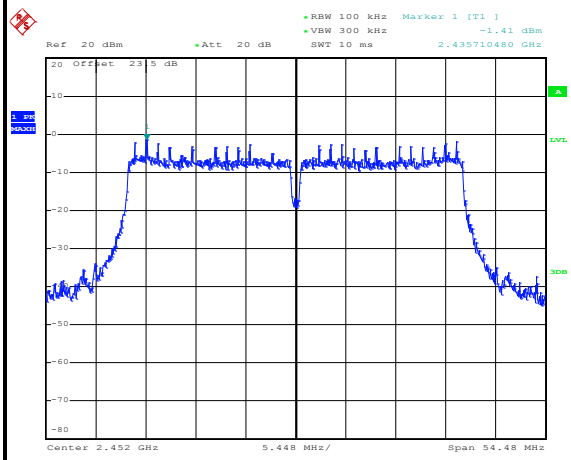


Date: 20.MAY.2016 21:35:08

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT40	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	09	**Test Engineer :**	Osolemio Chang and Derek Hsu

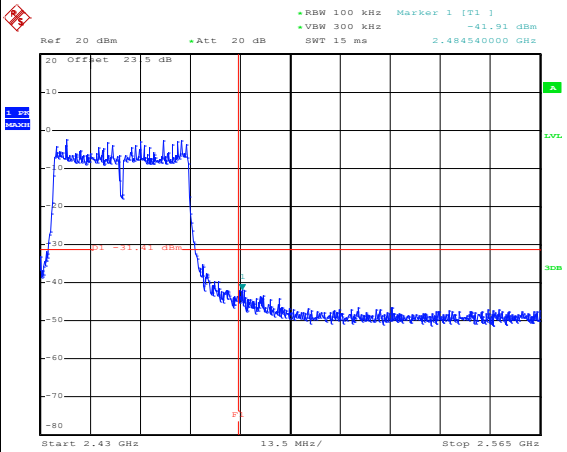
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



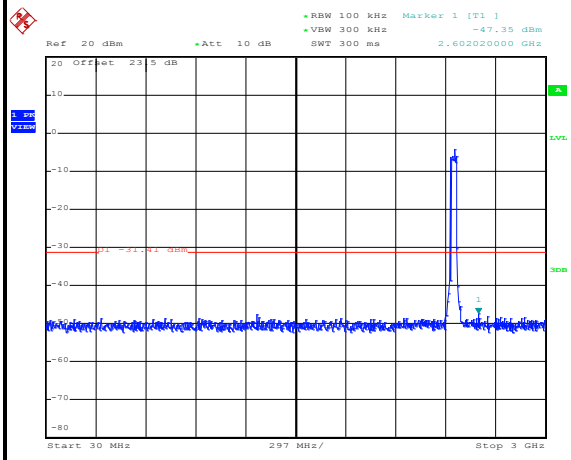
Date: 20.MAY.2016 21:28:38

High Channel Plot



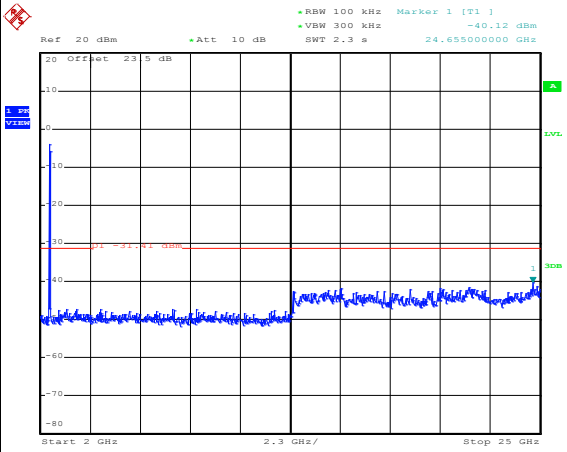
Date: 20.MAY.2016 21:28:46

Spurious Emission 30MHz~3GHz



Date: 20.MAY.2016 21:29:20

Spurious Emission 2GHz~25GHz



Date: 20.MAY.2016 21:29:29

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

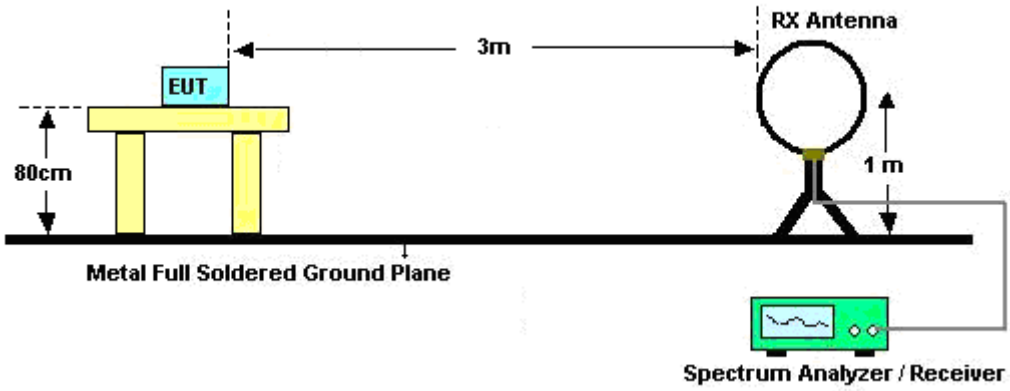
3.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

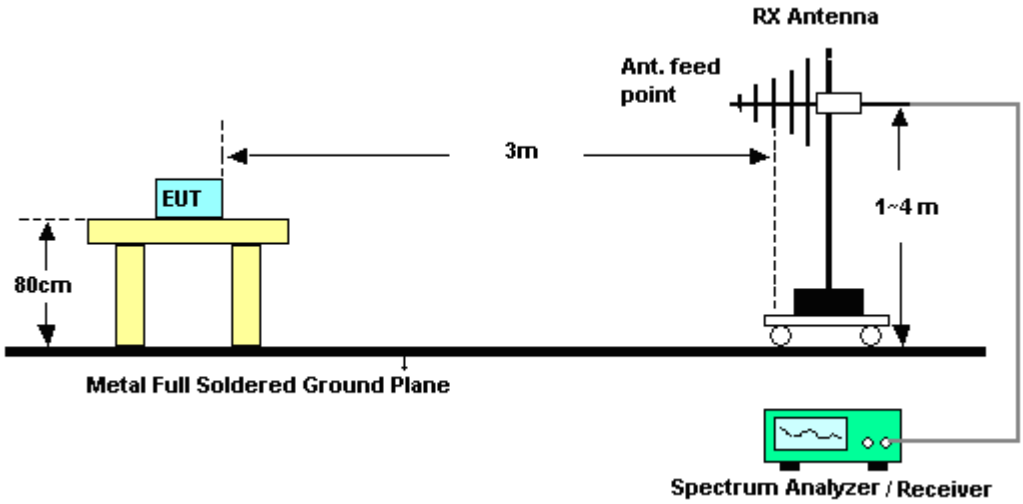
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

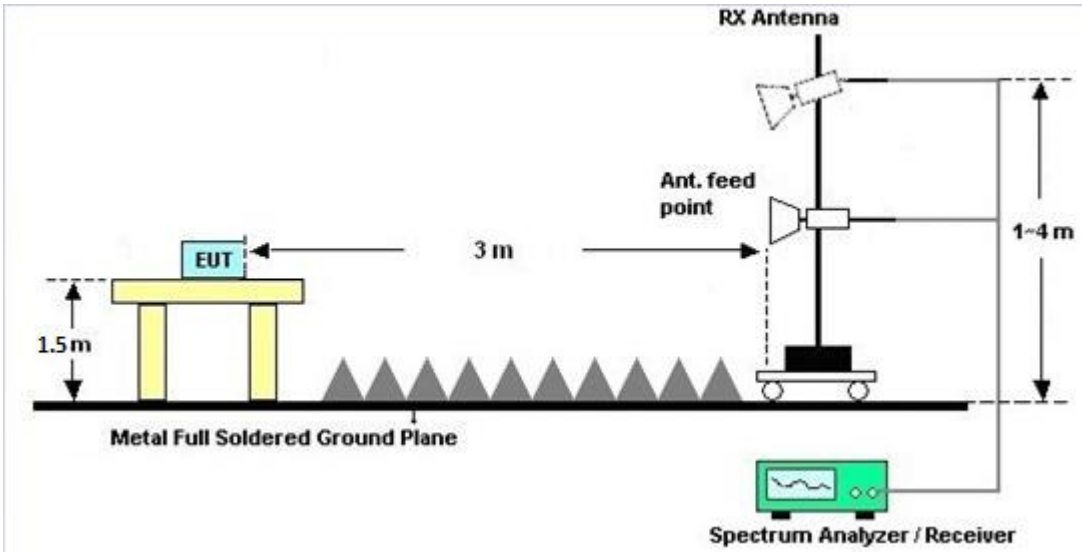
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

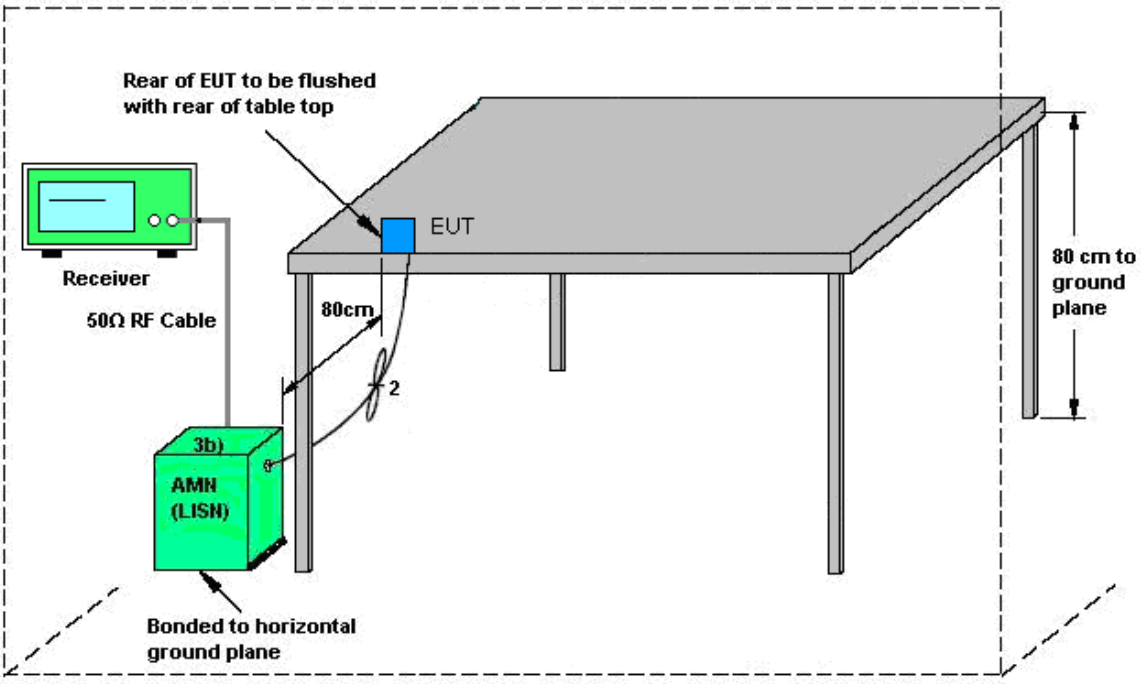
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

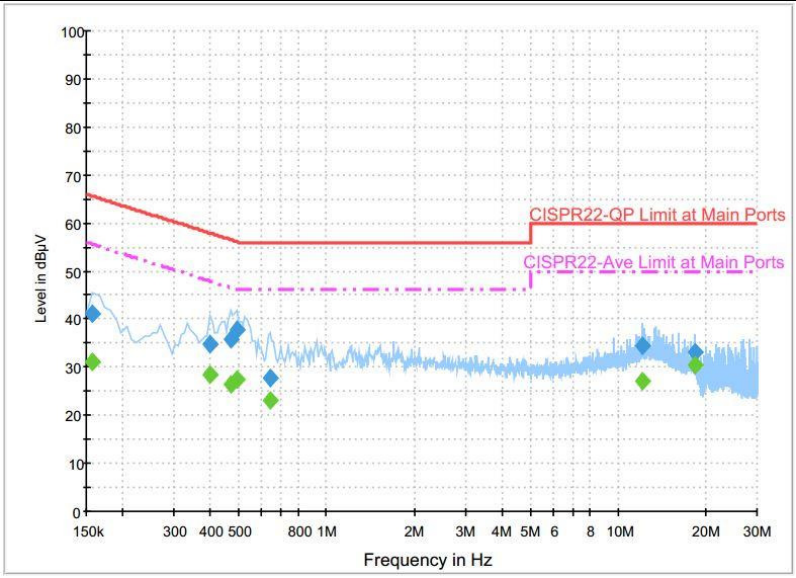
3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	22~23℃
Test Engineer :	Derreck Chen	**Relative Humidity :**	50~51%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (2.4GHz) 11n HT20 CH11 MCS0 Link + LAN Link + SD Card (Vedio Record) + Adapter		



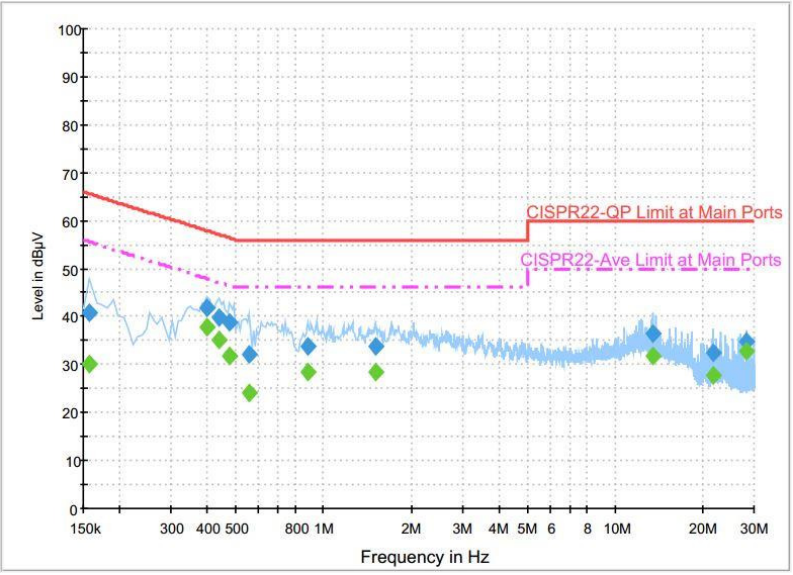
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	41.1	Off	L1	19.6	24.5	65.6
0.398000	34.7	Off	L1	19.6	23.2	57.9
0.470000	35.9	Off	L1	19.6	20.6	56.5
0.494000	37.7	Off	L1	19.6	18.4	56.1
0.638000	27.8	Off	L1	19.6	28.2	56.0
12.198000	34.3	Off	L1	19.7	25.7	60.0
18.430000	33.1	Off	L1	19.8	26.9	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	31.0	Off	L1	19.6	24.6	55.6
0.398000	28.4	Off	L1	19.6	19.5	47.9
0.470000	26.4	Off	L1	19.6	20.1	46.5
0.494000	27.3	Off	L1	19.6	18.8	46.1
0.638000	23.1	Off	L1	19.6	22.9	46.0
12.198000	27.0	Off	L1	19.7	23.0	50.0
18.430000	30.5	Off	L1	19.8	19.5	50.0

Test Mode :	Mode 1	**Temperature :**	22~23℃
Test Engineer :	Derreck Chen	**Relative Humidity :**	50~51%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN (2.4GHz) 11n HT20 CH11 MCS0 Link + LAN Link + SD Card (Vedio Record) + Adapter		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	40.9	Off	N	19.6	24.7	65.6
0.398000	41.8	Off	N	19.6	16.1	57.9
0.438000	39.8	Off	N	19.6	17.3	57.1
0.478000	38.7	Off	N	19.6	17.7	56.4
0.558000	32.2	Off	N	19.6	23.8	56.0
0.886000	33.9	Off	N	19.6	22.1	56.0
1.502000	33.6	Off	N	19.6	22.4	56.0
13.558000	36.5	Off	N	19.8	23.5	60.0
21.662000	32.4	Off	N	20.0	27.6	60.0
28.414000	34.7	Off	N	20.1	25.3	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	30.1	Off	N	19.6	25.5	55.6
0.398000	37.8	Off	N	19.6	10.1	47.9
0.438000	35.0	Off	N	19.6	12.1	47.1
0.478000	31.9	Off	N	19.6	14.5	46.4
0.558000	24.2	Off	N	19.6	21.8	46.0
0.886000	28.3	Off	N	19.6	17.7	46.0
1.502000	28.5	Off	N	19.6	17.5	46.0
13.558000	31.9	Off	N	19.8	18.1	50.0
21.662000	27.7	Off	N	20.0	22.3	50.0
28.414000	32.6	Off	N	20.1	17.4	50.0

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the Antenna exceeds 6 dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Anti-Replacement Construction

	Antenna 1	Antenna 2
Antenna type	PIFA Antenna	External Omni Antenna
Antenna connector	Embedded-in design	RP-SMA connector

3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Unequal antenna gains, with equal transmit powers.

For antenna gains given by G1, G2, …, GN dBi

If transmit signals are correlated, then

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \ldots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	3.34	3.05	3.34	6.21	0.00	0.21

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Jul. 29, 2015	Apr. 29, 2016 ~ May 24, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 29, 2015	Apr. 29, 2016 ~ May 24, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 18, 2015	Apr. 29, 2016 ~ May 24, 2016	Jun. 17, 2016	Conducted (TH02-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Sep. 11, 2015	Apr. 29, 2016 ~ May 24, 2016	Sep. 10, 2016	Conducted (TH02-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 03, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	May 03, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	May 03, 2016	Dec. 01, 2016	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	May 01, 2016 ~ May 03, 2016	Sep. 01, 2016	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D	37059	30MHz~1GHz	Dec. 29, 2015	May 01, 2016 ~ May 03, 2016	Dec. 28, 2016	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 02, 2015	May 01, 2016 ~ May 03, 2016	Nov. 01, 2016	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	May 01, 2016 ~ May 03, 2016	Nov. 01, 2016	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 21, 2015	May 01, 2016 ~ May 03, 2016	Dec. 20, 2016	Radiation (03CH12-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	May 01, 2016 ~ May 03, 2016	Nov. 20, 2016	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-00101 800-30-10P	1815698	1GHz~18GHz	Dec. 14, 2015	May 01, 2016 ~ May 03, 2016	Dec. 13, 2016	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 30, 2016	May 01, 2016 ~ May 03, 2016	Jan. 29, 2017	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	May 01, 2016 ~ May 03, 2016	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0-360 degree	N/A	May 01, 2016 ~ May 03, 2016	N/A	Radiation (03CH12-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.26

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.40

Uncertainty of Radiated Emission Measurement (1GHz ~ 26.5GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.40

Appendix A. Conducted Test Results

Report Number : FR641001

Test Engineer:	osolemio Chang / Derek Hsu	Temperature:	21~25	°C
Test Date:	2016/4/29 ~ 2016/5/24	Relative Humidity:	51~54	%

Report Number : FR641001

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	2	1	2412	12.60	12.70	10.08	10.08	0.50	Pass
11b	1Mbps	2	6	2437	12.65	12.70	10.08	10.08	0.50	Pass
11b	1Mbps	2	11	2462	12.65	12.70	10.08	10.08	0.50	Pass
11g	6Mbps	2	1	2412	17.75	17.65	16.32	16.30	0.50	Pass
11g	6Mbps	2	6	2437	18.55	18.15	16.36	16.36	0.50	Pass
11g	6Mbps	2	11	2462	17.85	17.80	16.30	16.32	0.50	Pass
HT20	MCS0	2	1	2412	18.40	18.40	17.04	17.04	0.50	Pass
HT20	MCS0	2	6	2437	18.50	18.70	17.06	17.06	0.50	Pass
HT20	MCS0	2	11	2462	18.45	18.40	17.06	17.04	0.50	Pass
HT40	MCS0	2	3	2422	36.90	36.90	36.28	36.32	0.50	Pass
HT40	MCS0	2	6	2437	37.00	37.10	35.76	36.28	0.50	Pass
HT40	MCS0	2	9	2452	36.80	36.90	36.32	36.32	0.50	Pass

TEST RESULTS DATA
Peak Output Power

2.4GHz Band											
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)	
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2
11b	1Mbps	2	1	2412	21.81	21.39	24.62	3.34		27.96	
11b	1Mbps	2	6	2437	21.82	21.43	24.64	3.34		27.98	
11b	1Mbps	2	11	2462	21.68	21.82	24.76	3.34		28.10	
11g	6Mbps	2	1	2412	24.08	24.01	27.06	3.34		30.40	
11g	6Mbps	2	6	2437	25.18	24.88	28.04	3.34		31.38	
11g	6Mbps	2	11	2462	24.38	24.21	27.31	3.34		30.65	
HT20	MCS0	2	1	2412	23.69	23.42	26.57	3.34		29.91	
HT20	MCS0	2	6	2437	24.55	24.31	27.44	3.34		30.78	
HT20	MCS0	2	11	2462	23.55	23.41	26.49	3.34		29.83	
HT40	MCS0	2	3	2422	21.75	21.41	24.59	3.34		27.93	
HT40	MCS0	2	6	2437	23.92	23.68	26.81	3.34		30.15	
HT40	MCS0	2	9	2452	21.57	21.25	24.42	3.34		27.76	

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR641001

TEST RESULTS DATA
Average Output Power

2.4GHz Band																			
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	0.10	0.11	18.98	18.29	21.66	30.00		3.34		25.00		36.00		Pass
11b	1Mbps	2	6	2437	0.10	0.11	18.94	18.56	21.76	30.00		3.34		25.10		36.00		Pass
11b	1Mbps	2	11	2462	0.10	0.11	18.78	18.94	21.87	30.00		3.34		25.21		36.00		Pass
11g	6Mbps	2	1	2412	0.62	0.56	16.07	15.76	18.93	30.00		3.34		22.27		36.00		Pass
11g	6Mbps	2	6	2437	0.62	0.56	19.68	19.34	22.53	30.00		3.34		25.87		36.00		Pass
11g	6Mbps	2	11	2462	0.62	0.56	16.37	16.17	19.28	30.00		3.34		22.62		36.00		Pass
HT20	MCS0	2	1	2412	0.66	0.66	15.42	15.11	18.28	30.00		3.34		21.62		36.00		Pass
HT20	MCS0	2	6	2437	0.66	0.66	17.77	17.54	20.67	30.00		3.34		24.01		36.00		Pass
HT20	MCS0	2	11	2462	0.66	0.66	15.11	14.91	18.02	30.00		3.34		21.36		36.00		Pass
HT40	MCS0	2	3	2422	1.13	1.18	12.68	12.24	15.48	30.00		3.34		18.82		36.00		Pass
HT40	MCS0	2	6	2437	1.13	1.18	16.24	16.18	19.22	30.00		3.34		22.56		36.00		Pass
HT40	MCS0	2	9	2452	1.13	1.18	12.45	12.03	15.26	30.00		3.34		18.60		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR641001

TEST RESULTS DATA
Average Power Spectral Density

2.4GHz Band													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average PSD (dBm/3kHz)			DG (dBi)		Average PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-13.97	-14.06	-10.96	6.21		7.79		Pass
11b	1Mbps	2	6	2437	-14.39	-14.13	-11.12	6.21		7.79		Pass
11b	1Mbps	2	11	2462	-14.52	-14.41	-11.40	6.21		7.79		Pass
11g	6Mbps	2	1	2412	-17.07	-17.09	-14.06	6.21		7.79		Pass
11g	6Mbps	2	6	2437	-14.33	-14.54	-11.32	6.21		7.79		Pass
11g	6Mbps	2	11	2462	-17.18	-17.23	-14.17	6.21		7.79		Pass
HT20	MCS0	2	1	2412	-18.24	-19.04	-15.23	6.21		7.79		Pass
HT20	MCS0	2	6	2437	-16.78	-16.80	-13.77	6.21		7.79		Pass
HT20	MCS0	2	11	2462	-19.17	-18.98	-15.97	6.21		7.79		Pass
HT40	MCS0	2	3	2422	-23.53	-24.07	-20.52	6.21		7.79		Pass
HT40	MCS0	2	6	2437	-20.08	-20.50	-17.07	6.21		7.79		Pass
HT40	MCS0	2	9	2452	-24.31	-24.70	-21.30	6.21		7.79		Pass

Measured power density (dBm) has offset with cable loss.

Appendix B. Radiated Spurious Emission

Test Engineer :	Ricky Su, Citta Ke, and Nick Yu	Temperature :	21~23°C
		Relative Humidity :	56~58%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2387.76	68.9	-5.1	74	65.89	27.05	7.45	31.49	145	242	P	H
		2389.56	46.48	-7.52	54	43.47	27.05	7.45	31.49	145	242	A	H
	*	2412	112.01	-	-	108.96	27.09	7.45	31.49	145	242	P	H
	*	2414	106.82	-	-	103.77	27.09	7.45	31.49	145	242	A	H
													H
													H
		2388.66	62.61	-11.39	74	59.6	27.05	7.45	31.49	100	176	P	V
		2389.65	44.97	-9.03	54	41.96	27.05	7.45	31.49	100	176	A	V
	*	2412	107.88	-	-	104.83	27.09	7.45	31.49	100	176	P	V
	*	2412	103.04	-	-	99.99	27.09	7.45	31.49	100	176	A	V
													V
													V
802.11b CH 06 2437MHz		2386.5	61.51	-12.49	74	58.5	27.05	7.45	31.49	117	240	P	H
		2386.59	45.91	-8.09	54	42.9	27.05	7.45	31.49	117	240	A	H
	*	2437	112.15	-	-	108.96	27.18	7.49	31.48	117	240	P	H
	*	2437	107.64	-	-	104.45	27.18	7.49	31.48	117	240	A	H
		2484.64	64.68	-9.32	74	61.36	27.26	7.53	31.47	117	240	P	H
		2485.32	46.33	-7.67	54	43.01	27.26	7.53	31.47	117	240	A	H
		2390	58.48	-15.52	74	55.47	27.05	7.45	31.49	293	186	P	V
		2389.29	44.55	-9.45	54	41.54	27.05	7.45	31.49	293	186	A	V
	*	2437	109.11	-	-	105.92	27.18	7.49	31.48	293	186	P	V
	*	2437	104.86	-	-	101.67	27.18	7.49	31.48	293	186	A	V
		2484.88	61.04	-12.96	74	57.72	27.26	7.53	31.47	293	186	P	V
		2484.72	45.44	-8.56	54	42.12	27.26	7.53	31.47	293	186	A	V

802.11b CH 11 2462MHz	*	2462	112.32	-	-	109.04	27.22	7.53	31.47	100	241	P	H
	*	2462	107.39	-	-	104.11	27.22	7.53	31.47	100	241	A	H
		2484.88	70.54	-3.46	74	67.22	27.26	7.53	31.47	100	241	P	H
		2485.16	46.69	-7.31	54	43.37	27.26	7.53	31.47	100	241	A	H
													H
													H
	*	2462	109.41	-	-	106.13	27.22	7.53	31.47	262	194	P	V
	*	2462	104.59	-	-	101.31	27.22	7.53	31.47	262	194	A	V
		2484.88	66.32	-7.68	74	63	27.26	7.53	31.47	262	194	P	V
		2483.8	45.57	-8.43	54	42.25	27.26	7.53	31.47	262	194	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	47.38	-26.62	74	63.52	31.26	10.74	58.14	100	0	P	H
													H
													H
													H
		4824	43.98	-30.02	74	60.12	31.26	10.74	58.14	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4872	48.6	-25.4	74	64.48	31.33	10.89	58.1	100	0	P	H
		7311	43.29	-30.71	74	52.13	36.07	14.18	59.09	100	0	P	H
													H
													H
		4872	44.89	-29.11	74	60.77	31.33	10.89	58.1	100	0	P	V
		7311	43.26	-30.74	74	52.1	36.07	14.18	59.09	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4926	50.7	-23.3	74	66.32	31.4	11.04	58.06	100	0	P	H
		7386	43.63	-30.37	74	52.19	36.31	14.27	59.14	100	0	P	H
													H
													H
		4926	47.39	-26.61	74	63.01	31.4	11.04	58.06	100	0	P	V
		7386	43.99	-30.01	74	52.55	36.31	14.27	59.14	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2388.93	65.93	-8.07	74	62.92	27.05	7.45	31.49	120	245	P	H
		2390	52.99	-1.01	54	49.98	27.05	7.45	31.49	120	245	A	H
	*	2414	110.19	-	-	107.14	27.09	7.45	31.49	120	245	P	H
	*	2414	100.63	-	-	97.58	27.09	7.45	31.49	120	245	A	H
													H
													H
		2389.29	59.21	-14.79	74	56.2	27.05	7.45	31.49	376	181	P	V
		2390	47.09	-6.91	54	44.08	27.05	7.45	31.49	376	181	A	V
	*	2414	106.38	-	-	103.33	27.09	7.45	31.49	376	181	P	V
	*	2414	97.04	-	-	93.99	27.09	7.45	31.49	376	181	A	V
													V
													V
802.11g CH 06 2437MHz		2386.32	57.86	-16.14	74	54.85	27.05	7.45	31.49	112	240	P	H
		2384.88	46.51	-7.49	54	43.54	27.01	7.45	31.49	112	240	A	H
	*	2439	113.48	-	-	110.29	27.18	7.49	31.48	112	240	P	H
	*	2439	104.74	-	-	101.55	27.18	7.49	31.48	112	240	A	H
		2498.36	58.08	-15.92	74	54.71	27.3	7.53	31.46	112	240	P	H
		2483.88	46.95	-7.05	54	43.63	27.26	7.53	31.47	112	240	A	H
		2334.84	57.55	-16.45	74	54.83	26.93	7.3	31.51	380	173	P	V
		2388.66	45	-9	54	41.99	27.05	7.45	31.49	380	173	A	V
	*	2435	109.75	-	-	106.61	27.13	7.49	31.48	380	173	P	V
	*	2435	101.31	-	-	98.17	27.13	7.49	31.48	380	173	A	V
		2487.64	56.79	-17.21	74	53.43	27.3	7.53	31.47	380	173	P	V
		2497.28	45.25	-8.75	54	41.88	27.3	7.53	31.46	380	173	A	V

802.11g CH 11 2462MHz	*	2464	111.53	-	-	108.25	27.22	7.53	31.47	110	240	P	H
	*	2464	102.19	-	-	98.91	27.22	7.53	31.47	110	240	A	H
		2484.52	69.06	-4.94	74	65.74	27.26	7.53	31.47	110	240	P	H
		2483.52	53.12	-0.88	54	49.8	27.26	7.53	31.47	110	240	A	H
													H
													H
	*	2460	109.14	-	-	105.9	27.22	7.49	31.47	327	174	P	V
	*	2460	97.44	-	-	94.2	27.22	7.49	31.47	327	174	A	V
		2484.24	66.69	-7.31	74	63.37	27.26	7.53	31.47	327	174	P	V
		2483.6	52.15	-1.85	54	48.83	27.26	7.53	31.47	327	174	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	47.97	-26.03	74	64.11	31.26	10.74	58.14	100	0	P	H
													H
													H
													H
		4824	44.6	-29.4	74	60.74	31.26	10.74	58.14	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4872	52.77	-21.23	74	68.65	31.33	10.89	58.1	100	0	P	H
		7311	48.43	-25.57	74	57.27	36.07	14.18	59.09	100	0	P	H
													H
													H
		4872	48.16	-25.84	74	64.04	31.33	10.89	58.1	100	0	P	V
		7311	49.44	-24.56	74	58.28	36.07	14.18	59.09	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4926	48.02	-25.98	74	63.64	31.4	11.04	58.06	100	0	P	H
		7386	44.19	-29.81	74	52.75	36.31	14.27	59.14	100	0	P	H
													H
													H
		4926	43.04	-30.96	74	58.66	31.4	11.04	58.06	100	0	P	V
		7386	44.46	-29.54	74	53.02	36.31	14.27	59.14	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2390	67.94	-6.06	74	64.93	27.05	7.45	31.49	142	248	P	H
		2389.92	52.92	-1.08	54	49.91	27.05	7.45	31.49	142	248	A	H
	*	2412	110.2	-	-	107.15	27.09	7.45	31.49	142	248	P	H
	*	2412	99.24	-	-	96.19	27.09	7.45	31.49	142	248	A	H
													H
													H
		2388.39	60.87	-13.13	74	57.86	27.05	7.45	31.49	385	176	P	V
		2389.65	48.83	-5.17	54	45.82	27.05	7.45	31.49	385	176	A	V
	*	2412	106.64	-	-	103.59	27.09	7.45	31.49	385	176	P	V
	*	2412	96.76	-	-	93.71	27.09	7.45	31.49	385	176	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2381.64	57.3	-16.7	74	54.33	27.01	7.45	31.49	115	240	P	H
		2384.79	46.12	-7.88	54	43.15	27.01	7.45	31.49	115	240	A	H
	*	2437	112.45	-	-	109.26	27.18	7.49	31.48	115	240	P	H
	*	2437	102.88	-	-	99.69	27.18	7.49	31.48	115	240	A	H
		2486.28	57.39	-16.61	74	54.07	27.26	7.53	31.47	115	240	P	H
		2489.72	46.22	-7.78	54	42.86	27.3	7.53	31.47	115	240	A	H
		2376.51	55.93	-18.07	74	53.04	27.01	7.37	31.49	380	176	P	V
		2388.84	44.71	-9.29	54	41.7	27.05	7.45	31.49	380	176	A	V
	*	2437	109.21	-	-	106.02	27.18	7.49	31.48	380	176	P	V
	*	2437	99.45	-	-	96.26	27.18	7.49	31.48	380	176	A	V
		2486.76	56.38	-17.62	74	53.06	27.26	7.53	31.47	380	176	P	V
		2497.56	44.98	-9.02	54	41.61	27.3	7.53	31.46	380	176	A	V

802.11n HT20 CH 11 2462MHz	*	2462	110.5	-	-	107.22	27.22	7.53	31.47	134	239	P	H
	*	2462	100.57	-	-	97.29	27.22	7.53	31.47	134	239	A	H
		2484.84	69.01	-4.99	74	65.69	27.26	7.53	31.47	134	239	P	H
		2483.52	53.48	-0.52	54	50.16	27.26	7.53	31.47	134	239	A	H
													H
													H
	*	2462	107.19	-	-	103.91	27.22	7.53	31.47	363	173	P	V
	*	2462	97.36	-	-	94.08	27.22	7.53	31.47	363	173	A	V
		2483.76	63.32	-10.68	74	60	27.26	7.53	31.47	363	173	P	V
		2483.52	50.25	-3.75	54	46.93	27.26	7.53	31.47	363	173	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	49.54	-24.46	74	65.68	31.26	10.74	58.14	100	0	P	H
													H
													H
													H
		4824	44.14	-29.86	74	60.28	31.26	10.74	58.14	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4872	48.88	-25.12	74	64.76	31.33	10.89	58.1	100	0	P	H
		7311	44.81	-29.19	74	53.65	36.07	14.18	59.09	100	0	P	H
													H
													H
		4872	46.37	-27.63	74	62.25	31.33	10.89	58.1	100	0	P	V
		7308	47.6	-26.4	74	56.44	36.07	14.18	59.09	100	0	P	V
													V
													V
802.11n HT20 CH 11 2462MHz		4926	49.06	-24.94	74	64.68	31.4	11.04	58.06	100	0	P	H
		7386	43.05	-30.95	74	51.61	36.31	14.27	59.14	100	0	P	H
													H
													H
		4926	45.45	-28.55	74	61.07	31.4	11.04	58.06	100	0	P	V
		7386	44.75	-29.25	74	53.31	36.31	14.27	59.14	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		2388.75	63.92	-10.08	74	60.91	27.05	7.45	31.49	113	246	P	H
		2389.83	53	-1	54	49.99	27.05	7.45	31.49	113	246	A	H
	*	2422	104.46	-	-	101.32	27.13	7.49	31.48	113	246	P	H
	*	2422	95.65	-	-	92.51	27.13	7.49	31.48	113	246	A	H
		2483.64	56.57	-17.43	74	53.25	27.26	7.53	31.47	113	246	P	H
		2487.72	45.96	-8.04	54	42.6	27.3	7.53	31.47	113	246	A	H
		2387.67	59.28	-14.72	74	56.27	27.05	7.45	31.49	380	177	P	V
		2387.58	47.59	-6.41	54	44.58	27.05	7.45	31.49	380	177	A	V
	*	2422	101.11	-	-	97.97	27.13	7.49	31.48	380	177	P	V
	*	2422	91.92	-	-	88.78	27.13	7.49	31.48	380	177	A	V
		2498	56.35	-17.65	74	52.98	27.3	7.53	31.46	380	177	P	V
		2484.44	45.44	-8.56	54	42.12	27.26	7.53	31.47	380	177	A	V
802.11n HT40 CH 06 2437MHz		2390	66.16	-7.84	74	63.15	27.05	7.45	31.49	283	242	P	H
		2389.83	52.54	-1.46	54	49.53	27.05	7.45	31.49	283	242	A	H
	*	2437	108.3	-	-	105.11	27.18	7.49	31.48	283	242	P	H
	*	2437	98.94	-	-	95.75	27.18	7.49	31.48	283	242	A	H
		2484.32	63.81	-10.19	74	60.49	27.26	7.53	31.47	283	242	P	H
		2483.6	50.65	-3.35	54	47.33	27.26	7.53	31.47	283	242	A	H
		2389.92	59.76	-14.24	74	56.75	27.05	7.45	31.49	373	175	P	V
		2389.2	47.6	-6.4	54	44.59	27.05	7.45	31.49	373	175	A	V
	*	2437	105.11	-	-	101.92	27.18	7.49	31.48	373	175	P	V
	*	2437	96.06	-	-	92.87	27.18	7.49	31.48	373	175	A	V
		2487.56	60.88	-13.12	74	57.52	27.3	7.53	31.47	373	175	P	V
		2483.52	48.29	-5.71	54	44.97	27.26	7.53	31.47	373	175	A	V

802.11n HT40 CH 09 2452MHz		2345.1	57.1	-16.9	74	54.3	26.93	7.37	31.5	136	239	P	H
		2350.77	46.04	-7.96	54	43.24	26.93	7.37	31.5	136	239	A	H
	*	2452	104.51	-	-	101.31	27.18	7.49	31.47	136	239	P	H
	*	2452	96.11	-	-	92.91	27.18	7.49	31.47	136	239	A	H
		2484.68	65.32	-8.68	74	62	27.26	7.53	31.47	136	239	P	H
		2483.72	53.06	-0.94	54	49.74	27.26	7.53	31.47	136	239	A	H
		2386.5	55.98	-18.02	74	52.97	27.05	7.45	31.49	261	192	P	V
		2362.29	45.5	-8.5	54	42.66	26.97	7.37	31.5	261	192	A	V
	*	2452	101.77	-	-	98.57	27.18	7.49	31.47	261	192	P	V
	*	2452	92.96	-	-	89.76	27.18	7.49	31.47	261	192	A	V
		2487.68	62.38	-11.62	74	59.02	27.3	7.53	31.47	261	192	P	V
		2486.36	50.34	-3.66	54	47.02	27.26	7.53	31.47	261	192	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 03 2422MHz		4842	39.67	-34.33	74	55.77	31.28	10.74	58.12	100	0	P	H
		7266	42.85	-31.15	74	51.81	35.97	14.14	59.07	100	0	P	H
													H
													H
		4842	38.51	-35.49	74	54.61	31.28	10.74	58.12	100	0	P	V
		7266	42.78	-31.22	74	51.74	35.97	14.14	59.07	100	0	P	V
													V
													V
802.11n HT40 CH 06 2437MHz		4872	46.16	-27.84	74	62.04	31.33	10.89	58.1	100	0	P	H
		7308	42.39	-31.61	74	51.23	36.07	14.18	59.09	100	0	P	H
													H
													H
		4872	43.29	-30.71	74	59.17	31.33	10.89	58.1	100	0	P	V
		7308	43.21	-30.79	74	52.05	36.07	14.18	59.09	100	0	P	V
													V
													V
802.11n HT40 CH 09 2452MHz		4902	41.42	-32.58	74	57.07	31.38	11.04	58.07	100	0	P	H
		7356	43.11	-30.89	74	51.8	36.21	14.22	59.12	100	0	P	H
													H
													H
		4902	39.25	-34.75	74	54.9	31.38	11.04	58.07	100	0	P	V
		7356	43.34	-30.66	74	52.03	36.21	14.22	59.12	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
2.4GHz 802.11n HT20 LF		77.52	28.83	-11.17	40	46.89	13.32	1.06	32.44	-	-	P	H
		193.35	28.63	-14.87	43.5	43.89	15.45	1.7	32.41	-	-	P	H
		288.12	29.71	-16.29	46	40.45	19.26	2.25	32.25	-	-	P	H
		384	35.06	-10.94	46	42.91	21.82	2.68	32.35	-	-	P	H
		479.9	36.76	-9.24	46	42.43	23.64	3.08	32.39	-	-	P	H
		676.6	41.72	-4.28	46	44.09	26.22	3.82	32.41	145	321	P	H
													H
													H
													H
													H
													H
													H
		42.15	35.94	-4.06	40	49	18.62	0.78	32.46	100	40	QP	V
		77.52	28.95	-11.05	40	47.01	13.32	1.06	32.44	-	-	P	V
		288.12	29.12	-16.88	46	39.86	19.26	2.25	32.25	-	-	P	V
		311.9	33.91	-12.09	46	43.94	19.88	2.34	32.25	-	-	P	V
		384	32.46	-13.54	46	40.31	21.82	2.68	32.35	-	-	P	V
		960.8	38.69	-15.31	54	34.81	30.16	4.75	31.03	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Radiated Spurious Emission Plots

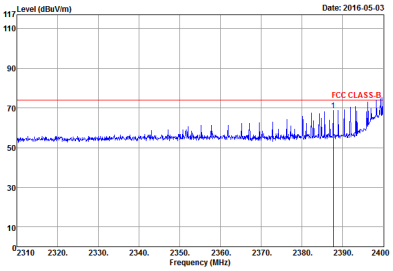
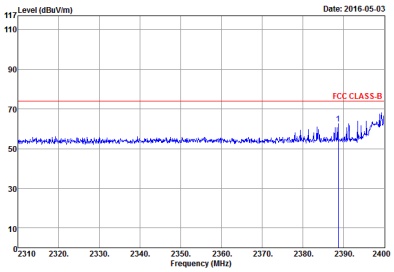
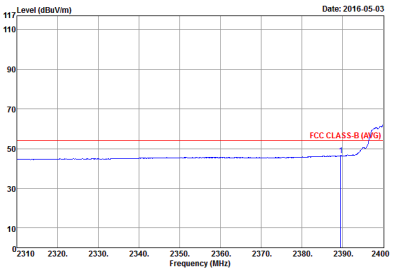
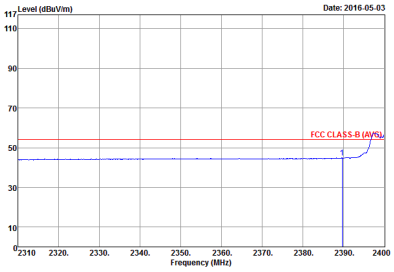
Test Engineer :	Ricky Su, Citta Ke, and Nick Yu	Temperature :	21~23°C
		Relative Humidity :	56~58%

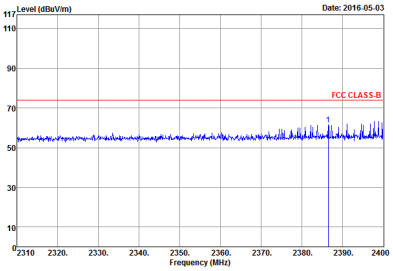
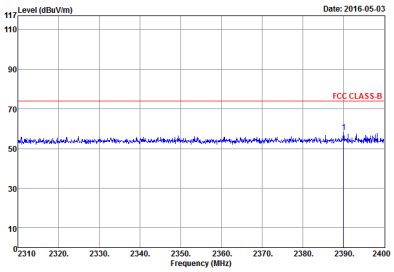
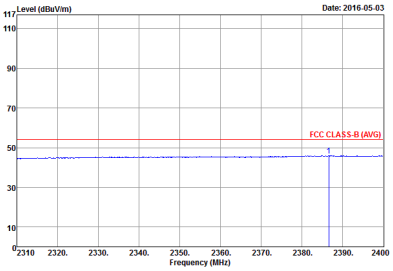
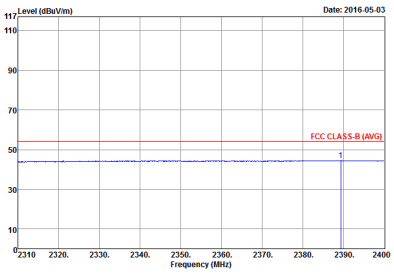
Note symbol

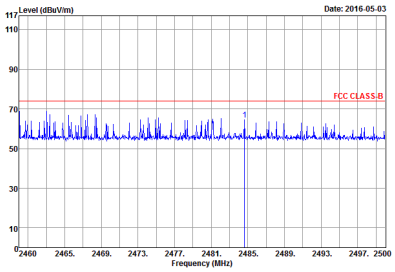
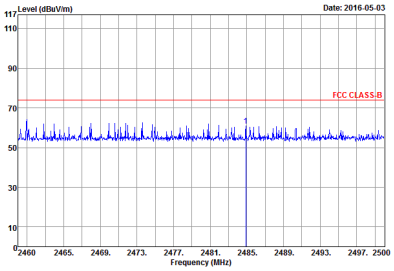
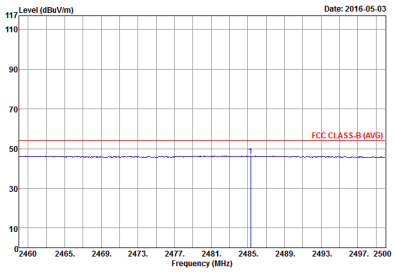
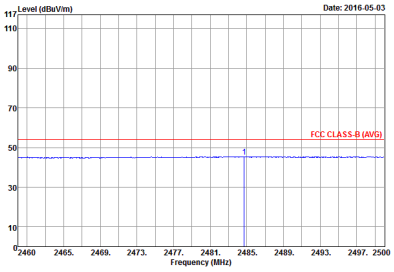
-L	**Low channel location**
-R	**High channel location**

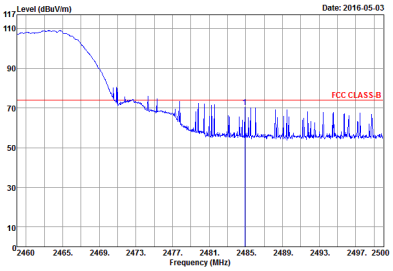
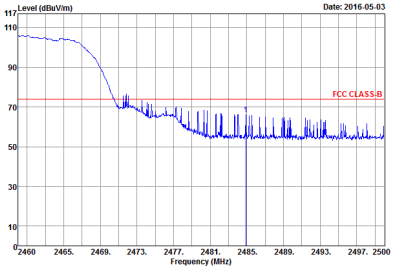
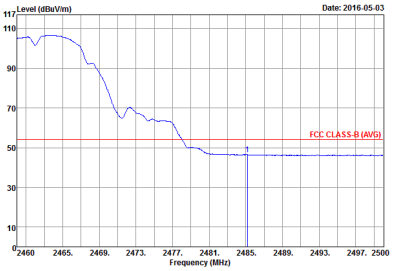
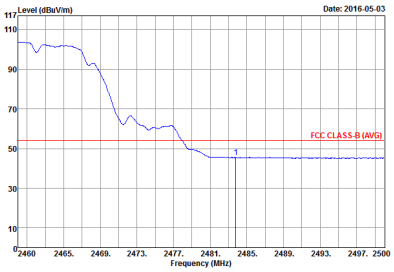
2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 1	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 1
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 1	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 1

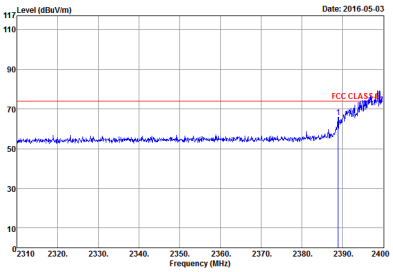
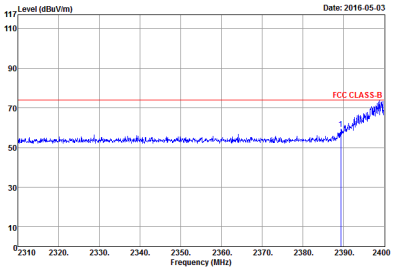
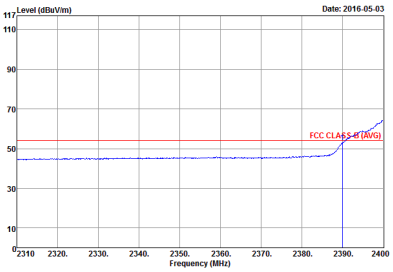
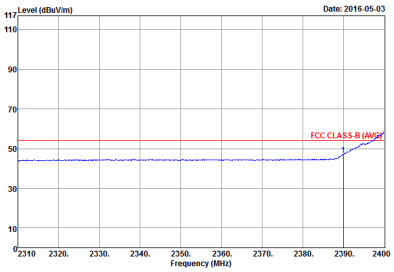
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2

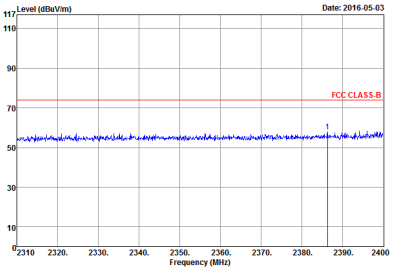
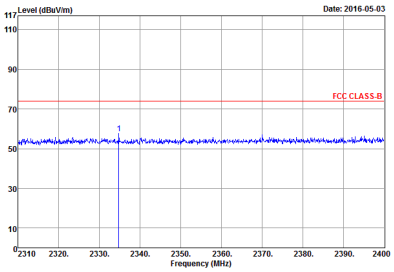
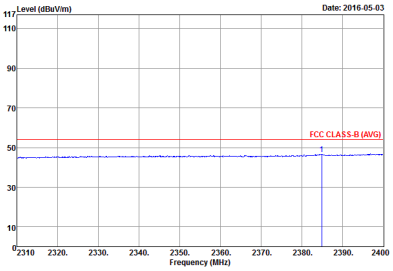
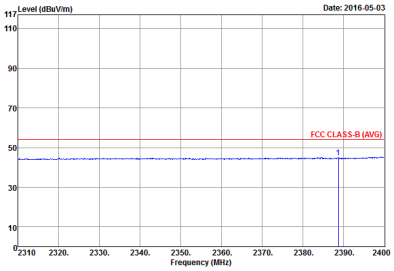
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH06 2437MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 2

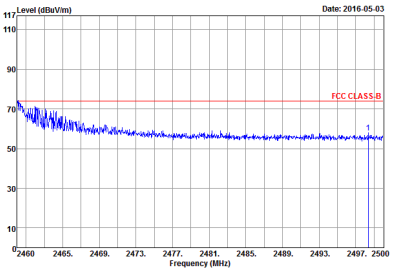
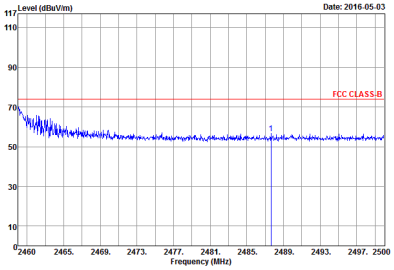
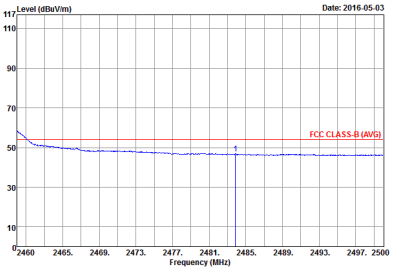
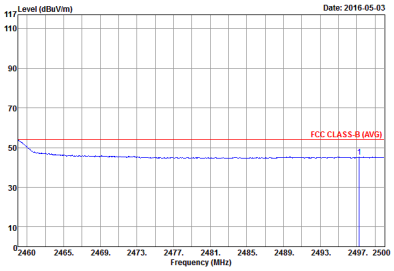
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 3	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 3
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 3	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:0.300KHz SWT:Auto Detector : Peak Project : 641001 Mode : 3

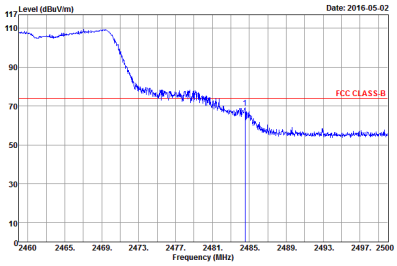
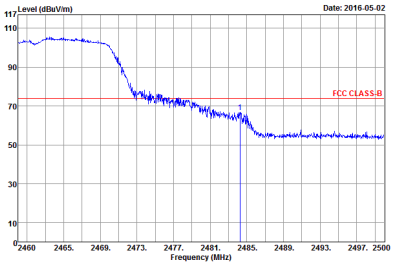
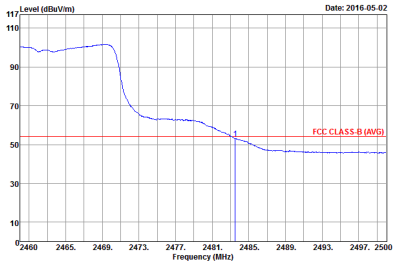
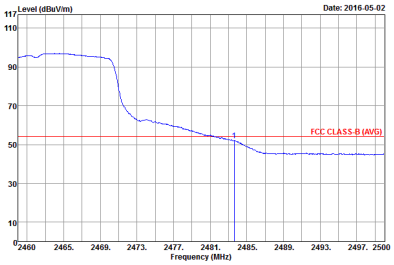
2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 4 Power Setting : 17	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 4 Power Setting : 17
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 4 Power Setting : 17	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 4 Power Setting : 17

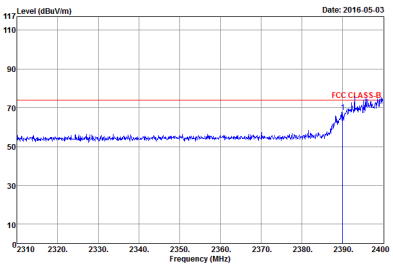
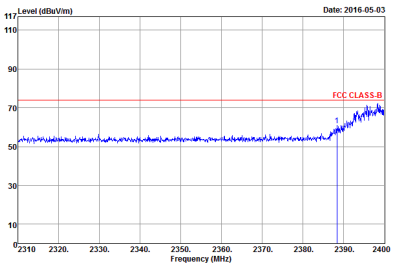
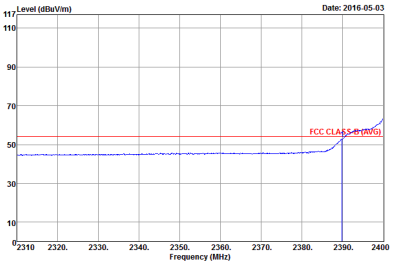
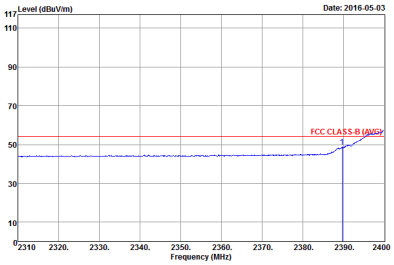
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5

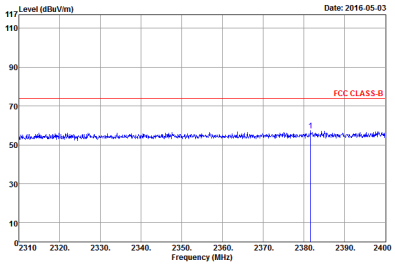
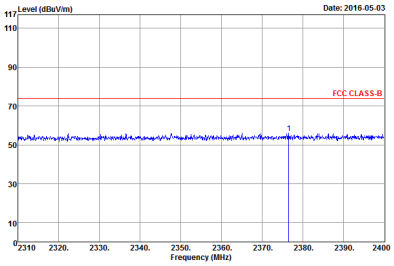
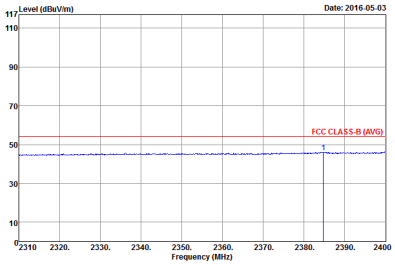
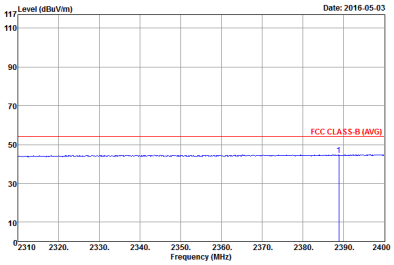
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH06 2437MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 5

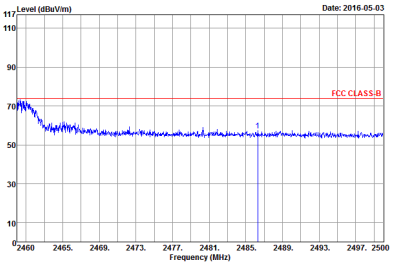
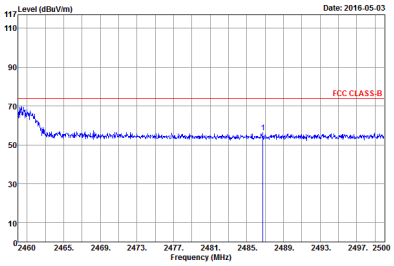
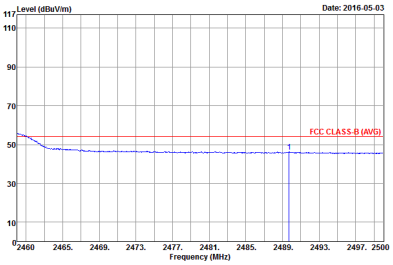
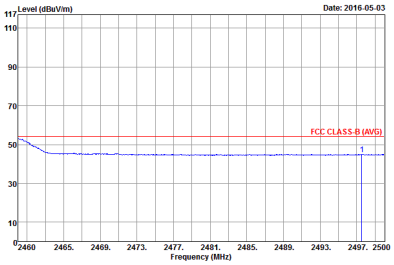
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 6 Power Setting : 19	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 6 Power Setting : 19
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 6 Power Setting : 19	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 6 Power Setting : 19

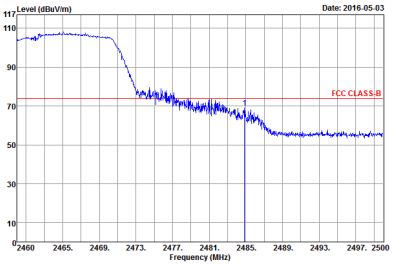
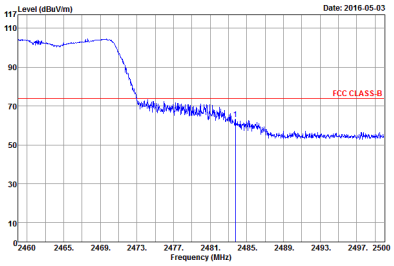
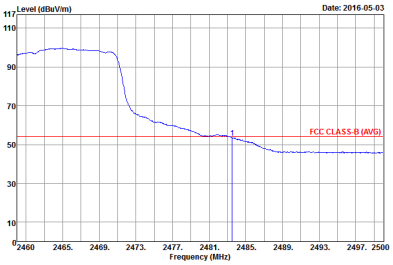
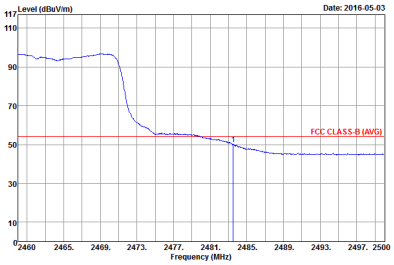
2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 7 Setting : 15	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 7 Setting : 15
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 7 Setting : 15	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 7 Setting : 15

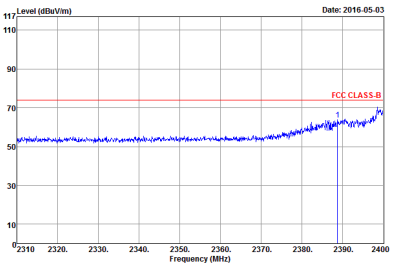
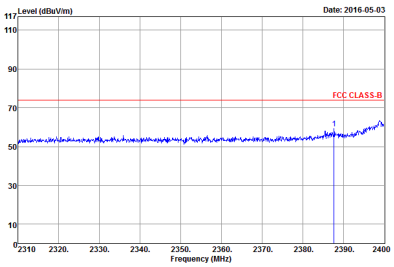
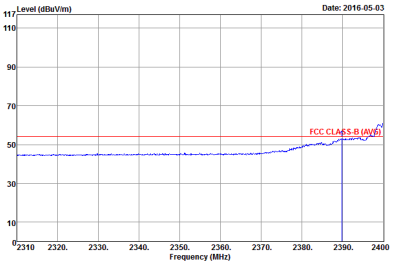
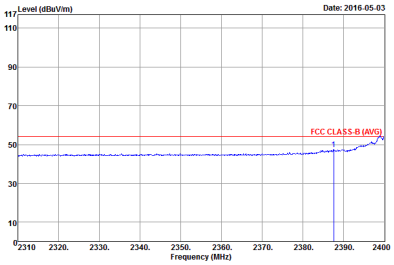
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8

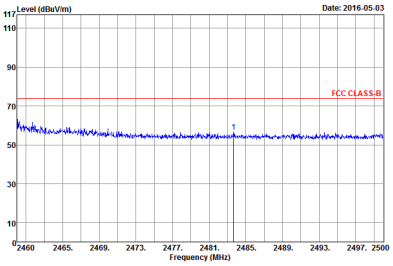
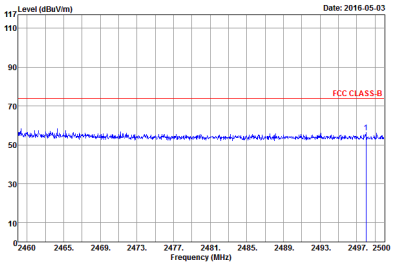
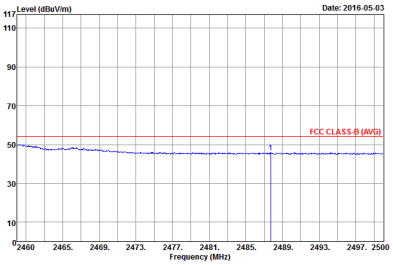
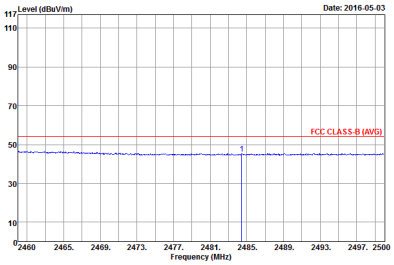
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH06 2437MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 8

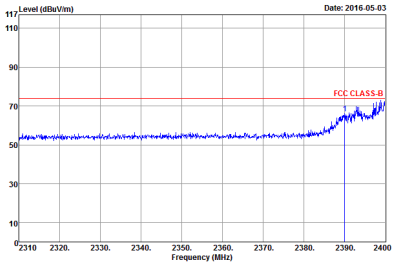
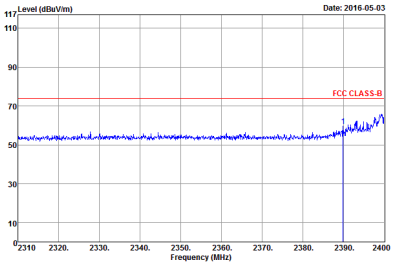
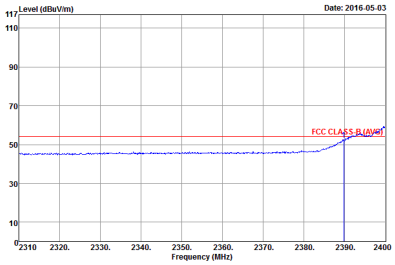
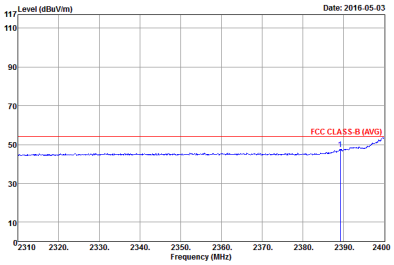
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 9 Setting : 16	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 9 Setting : 16
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 9 Setting : 16	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 9 Setting : 16

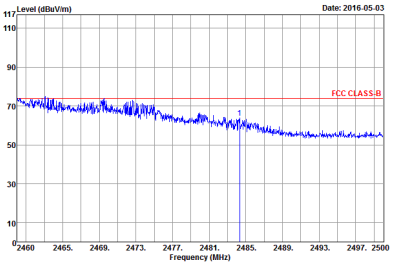
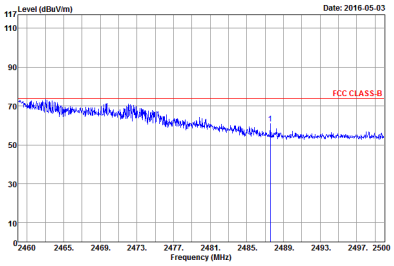
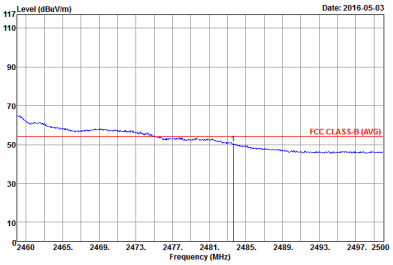
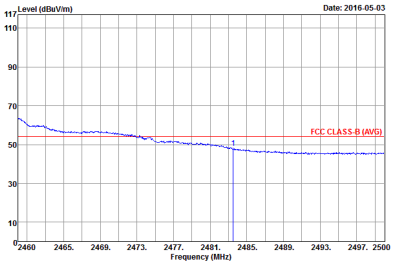
2.4GHz 2400~2483.5MHz

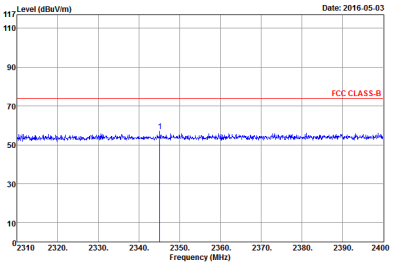
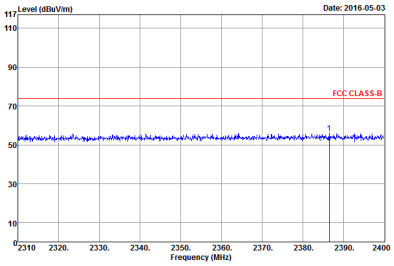
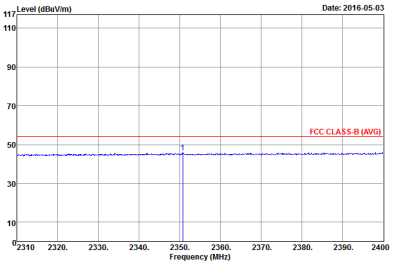
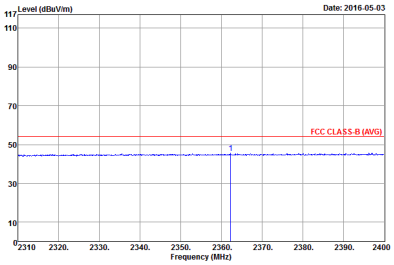
WIFI 802.11n HT40 (Band Edge @ 3m)

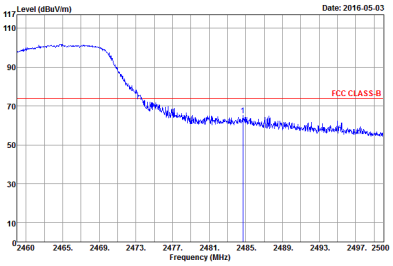
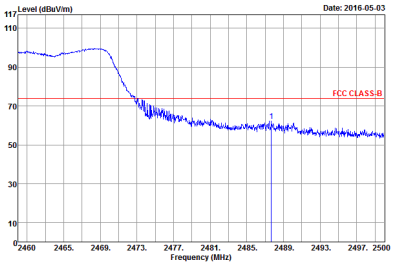
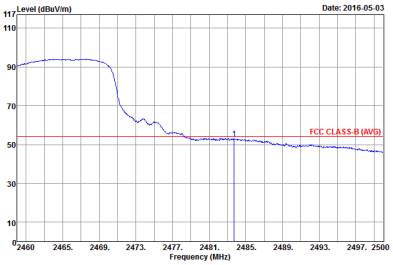
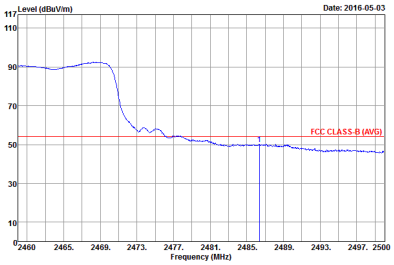
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH03 2422MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 10 Setting : 8

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18

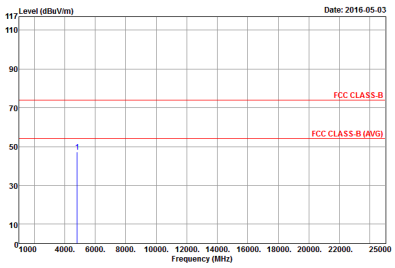
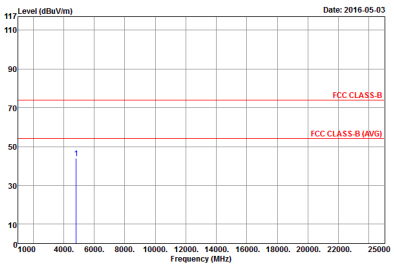
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH06 2437MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 11 Setting : 18

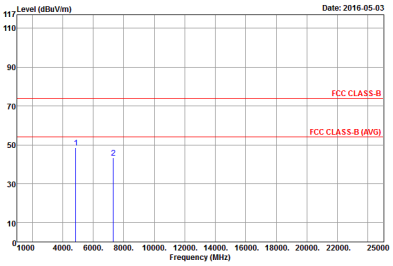
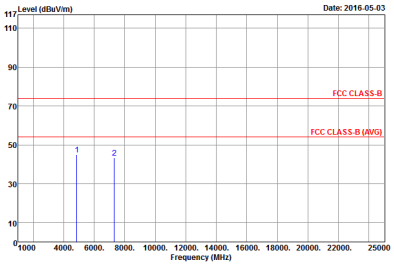
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - L	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8

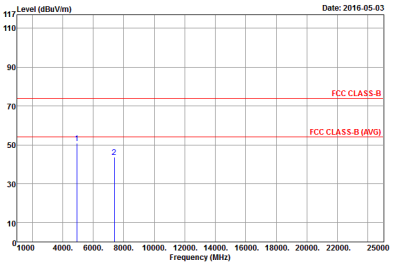
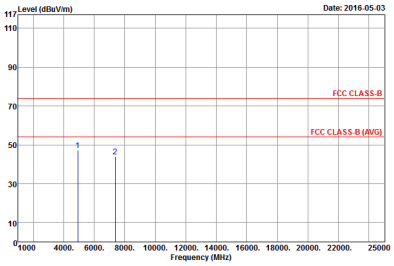
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT40 CH09 2452MHz - R	
1	Horizontal	Vertical
Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8
Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8	 Site : 03CH12-HY Condition : FCC CLASS-B (AVG) 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 641001 Mode : 12 Setting : 8

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

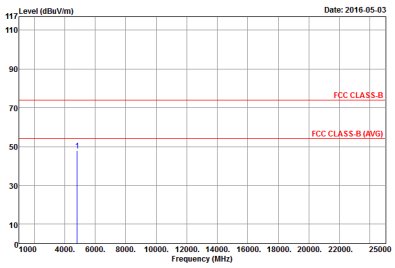
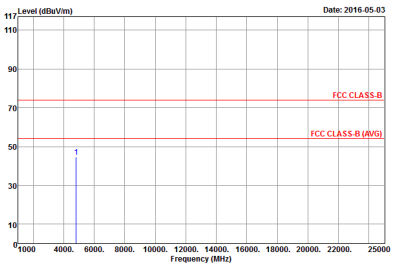
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 1	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 1

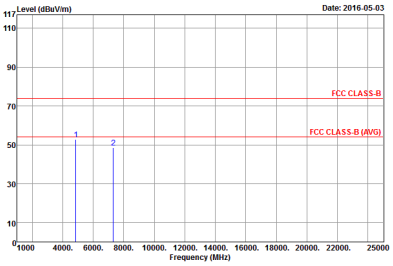
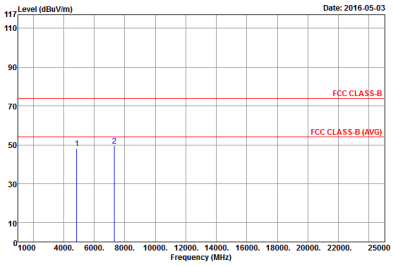
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Preject : 641001 Mode : 2	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Preject : 641001 Mode : 2

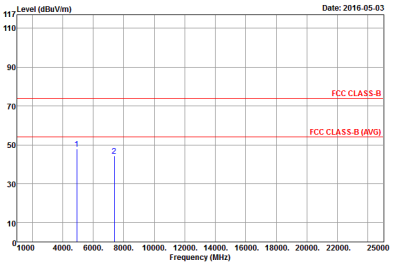
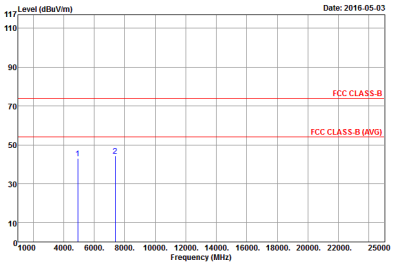
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11b CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 3	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 3

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

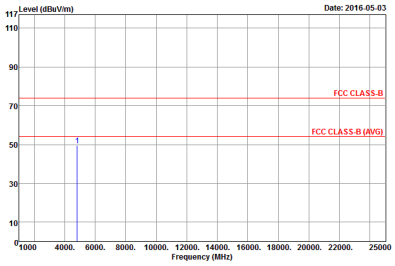
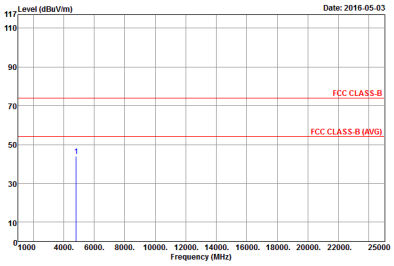
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

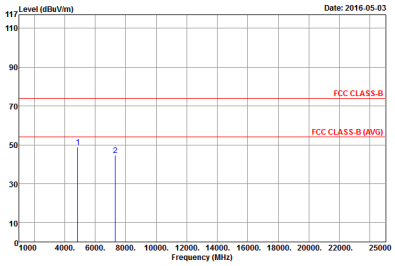
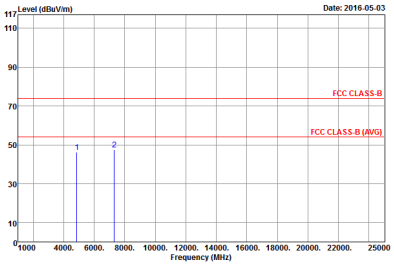
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 5	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 5

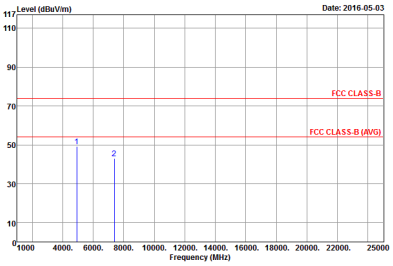
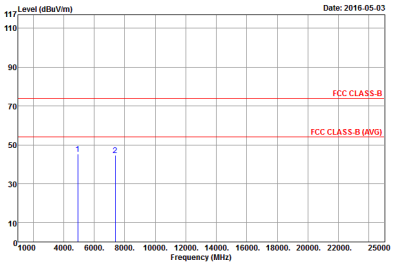
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11g CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 6	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 6

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

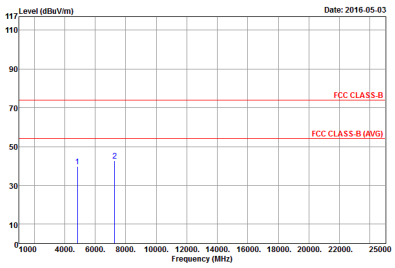
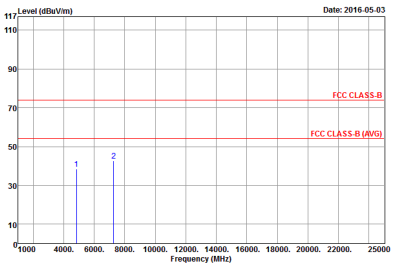
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH01 2412MHz	
1	Horizontal	Vertical
Peak Avg.		

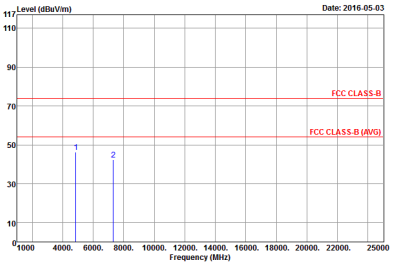
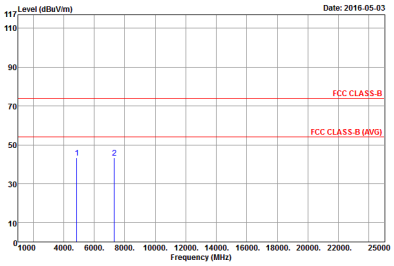
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 8	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 8

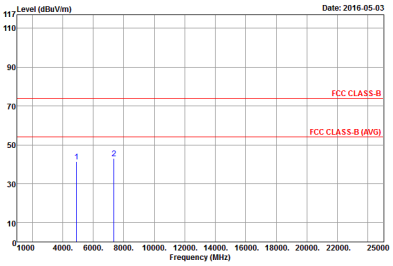
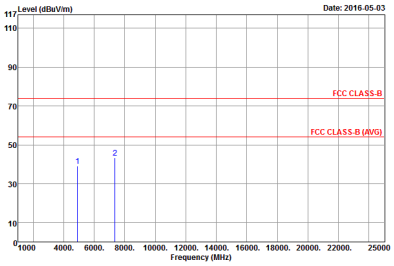
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 9	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 9

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

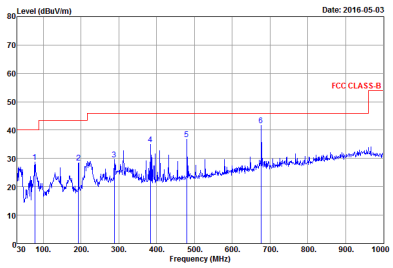
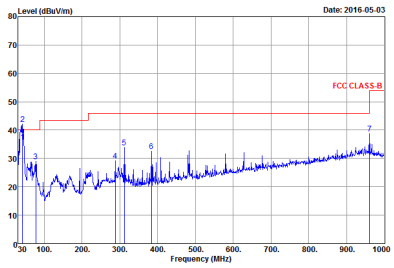
WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT40 CH03 2422MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 10	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 10

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT40 CH06 2437MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 11	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 11

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT40 CH09 2452MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 641001 Mode : 12	 Site : 03CH12-HY Condition : FCC CLASS-B 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 641001 Mode : 12

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

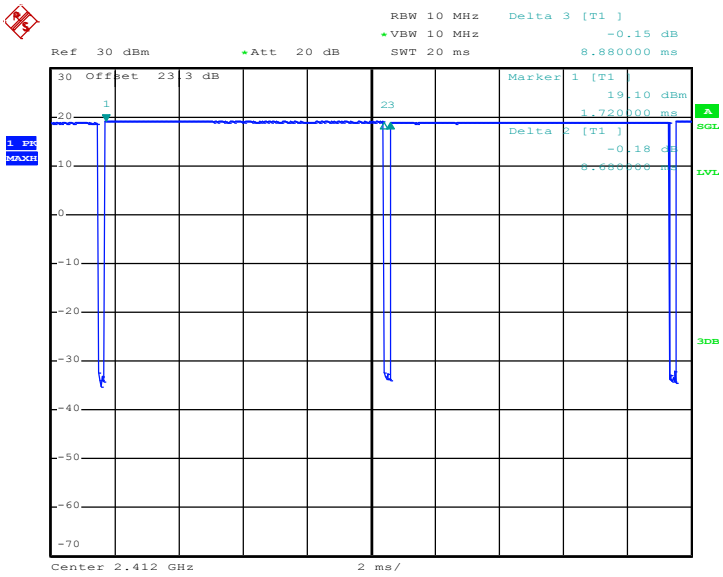
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 HORIZONTAL Detector : Peak Project : 641001 Mode : 13	 Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 VERTICAL Detector : Peak Project : 641001 Mode : 13

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	802.11b for Ant 1	97.75	8680	0.12	300Hz
1+2	802.11b for Ant 2	97.53	8700	0.11	300Hz
1+2	802.11g for Ant 1	86.67	1430	0.70	1kHz
1+2	802.11g for Ant 2	87.81	1440	0.69	1kHz
1+2	2.4GHz 802.11n HT20 for Ant 1	85.9	1340	0.75	1kHz
1+2	2.4GHz 802.11n HT20 for Ant 2	85.9	1340	0.75	1kHz
1+2	2.4GHz 802.11n HT40 for Ant 1	77.01	670	1.49	3kHz
1+2	2.4GHz 802.11n HT40 for Ant 2	76.14	670	1.49	3kHz

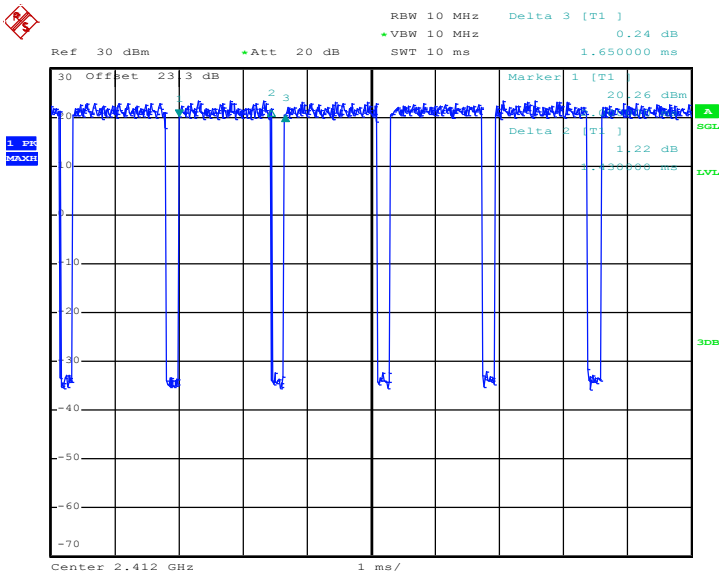
MIMO <Ant. 1+2(1)>

802.11b



Date: 29.APR.2016 04:15:10

802.11g



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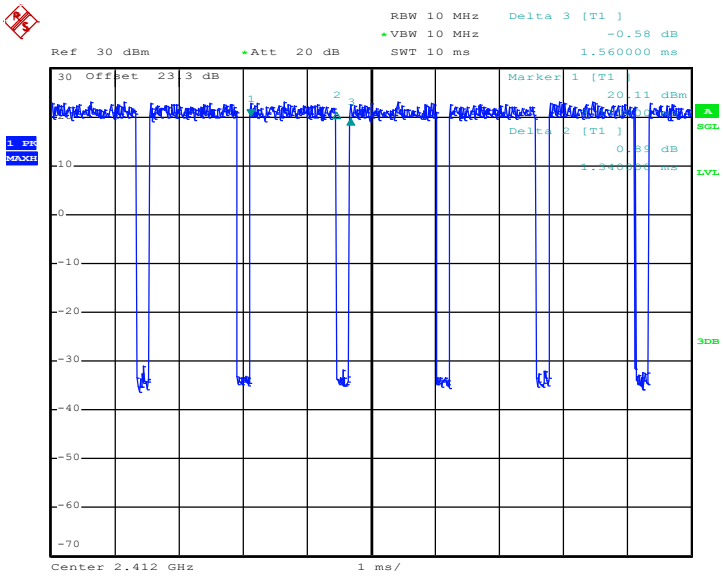
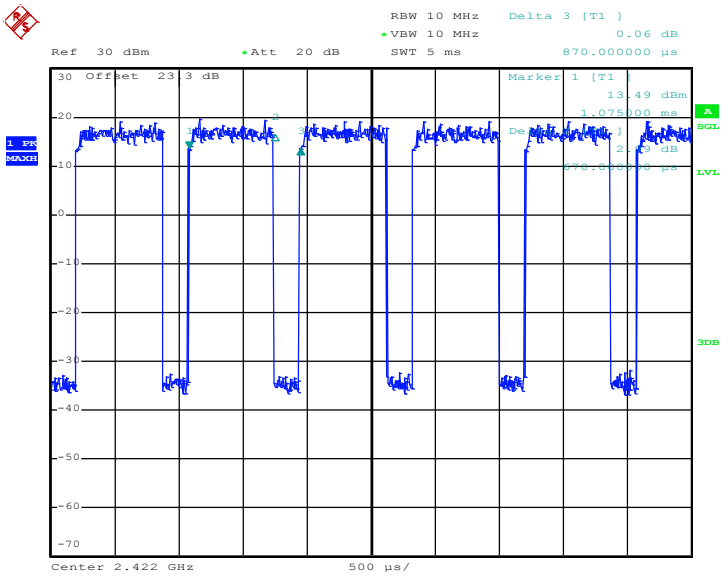
802.11n HT20



Date: 29.APR.2016 04:48:33

802.11n HT40



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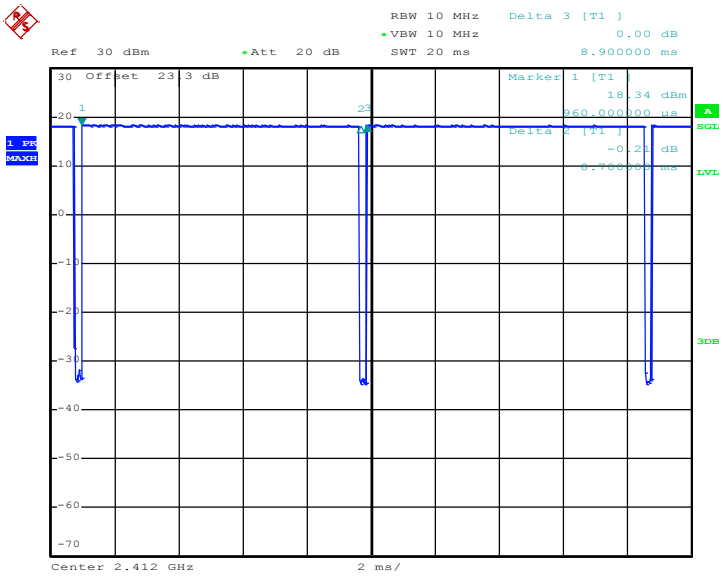
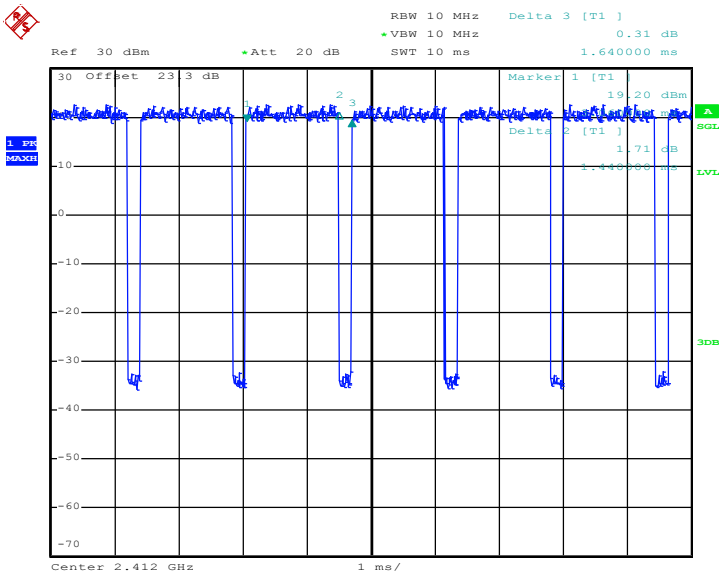
MIMO <Ant. 1+2(2)>

802.11b



Date: 29.APR.2016 04:16:12

802.11g



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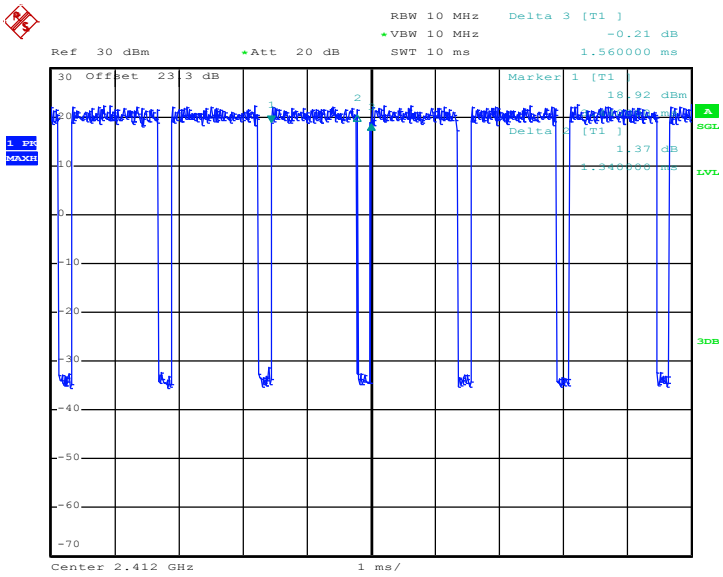

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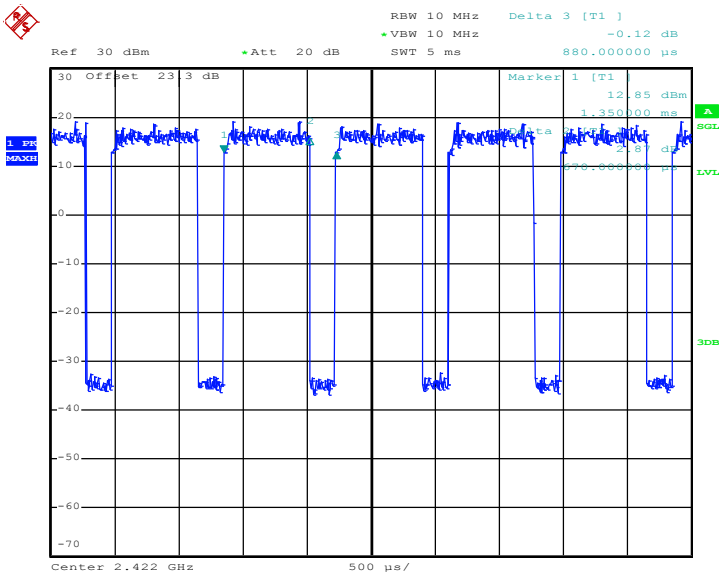

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